Fig. 1

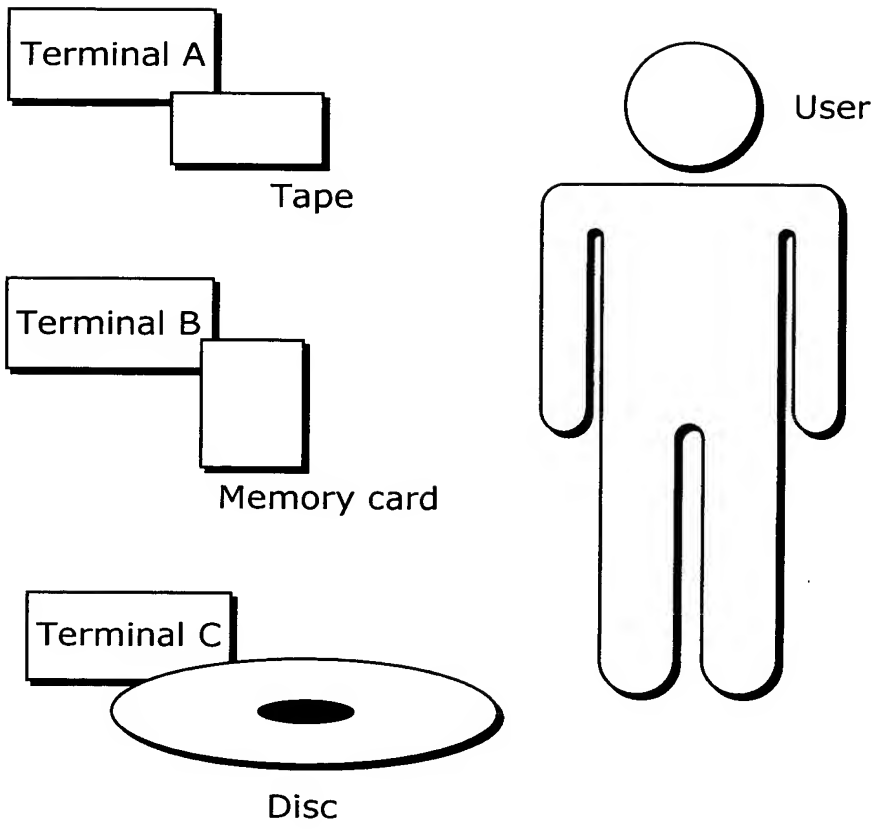


Fig. 2

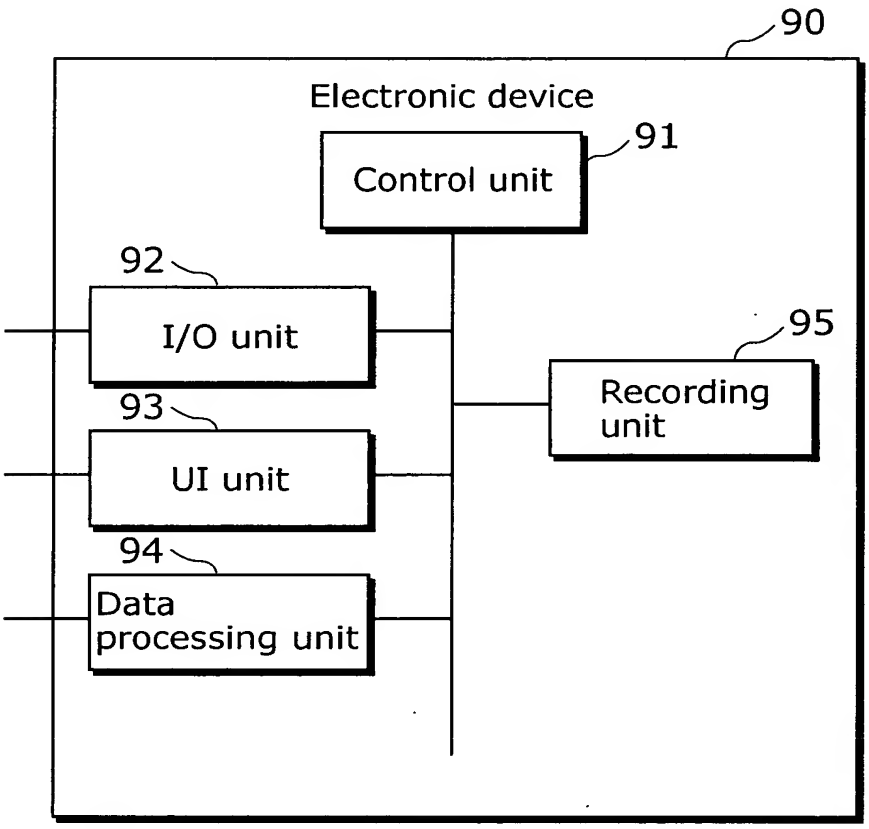

90
Electronic device
91
Control unit
92
I/O unit
93
UI unit
94
Data processing unit
95
Recording unit

Fig. 3

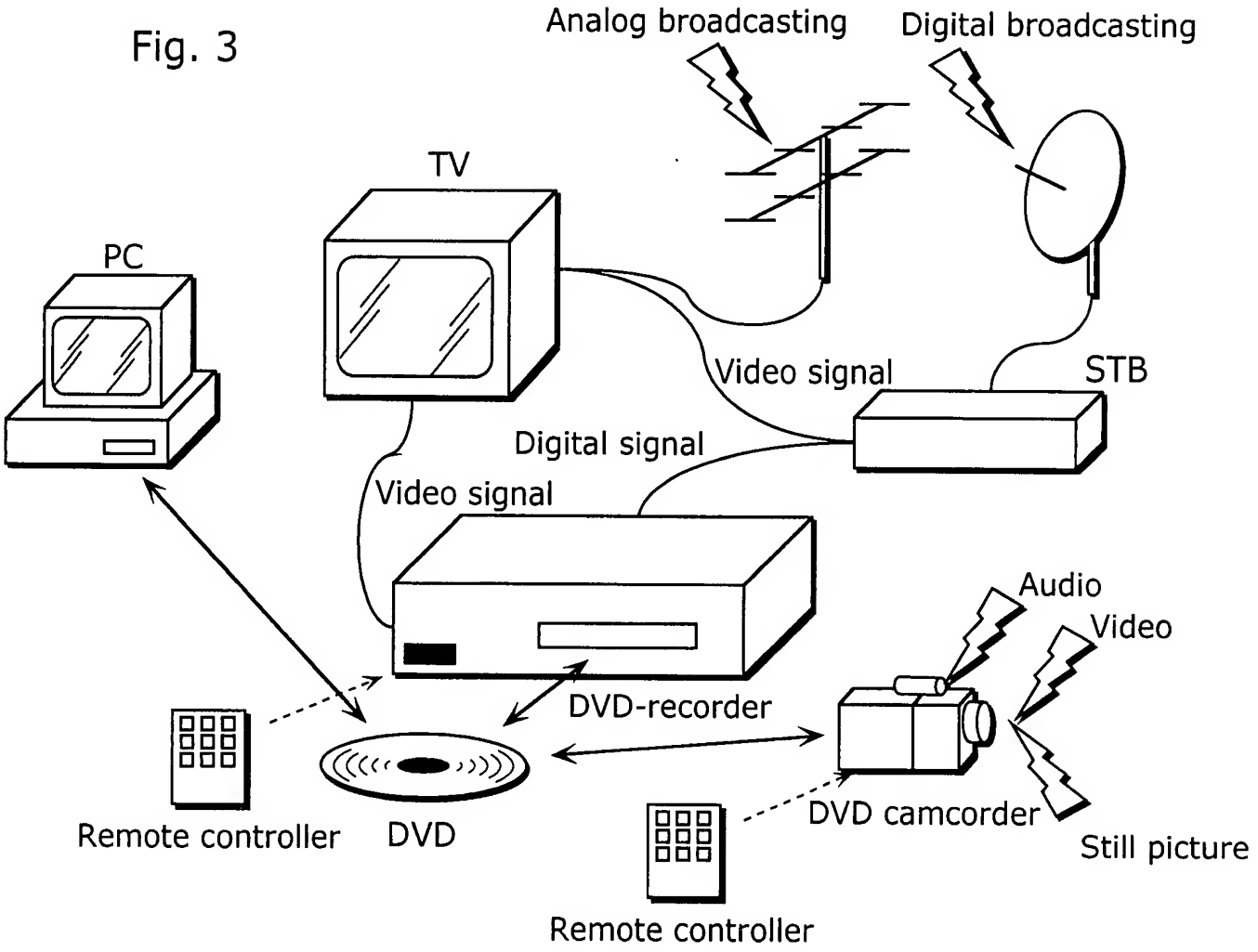

Analog broadcasting
Digital broadcasting
TV
PC
Video signal
STB
Digital signal
Video signal
Audio
Video
DVD-recorder
Remote controller
DVD
DVD camcorder
Still picture
Remote controller

Fig. 4

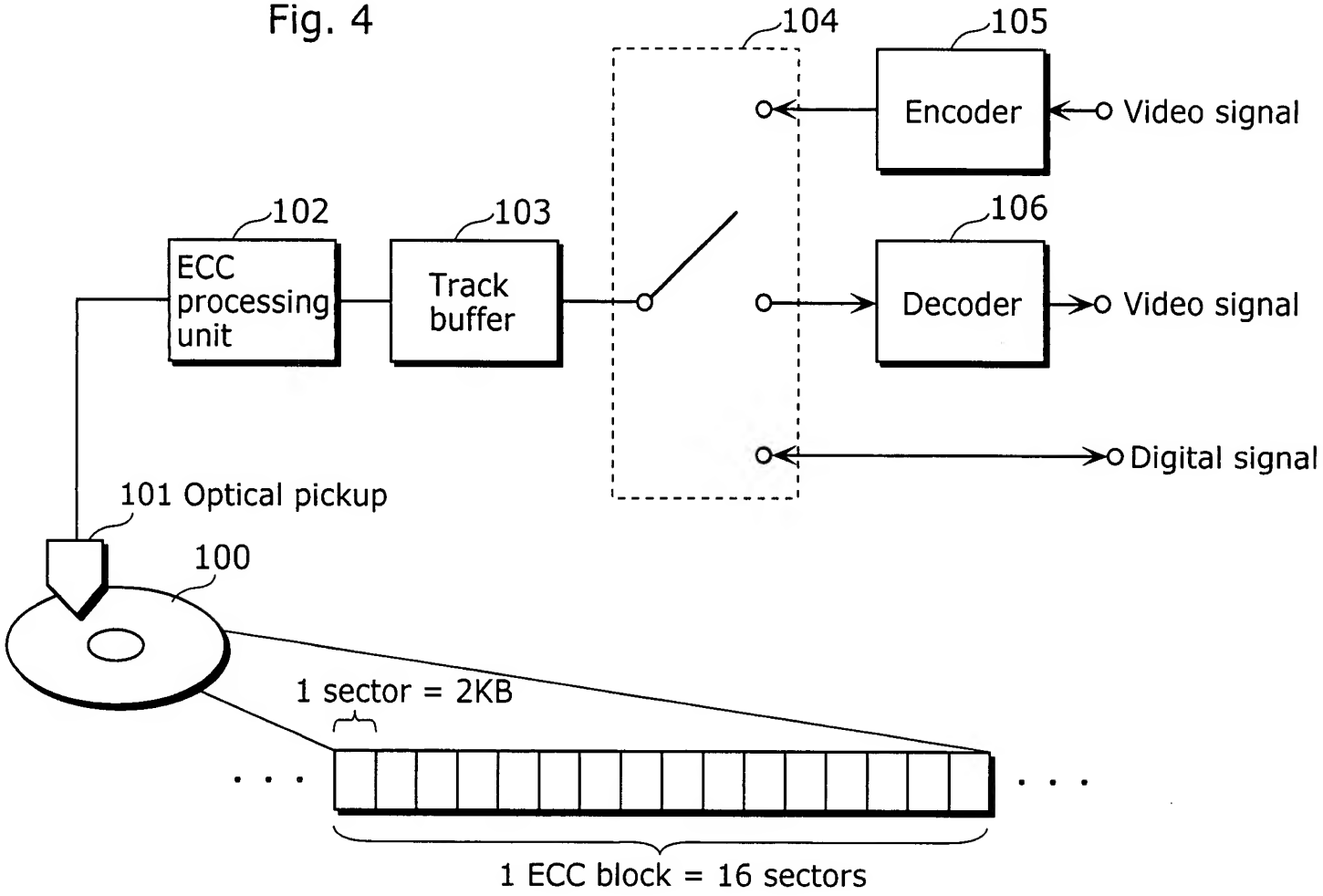

104
105
Encoder
Video signal
102
103
106
ECC processing unit
Track buffer
Decoder
Video signal
Digital signal
101 Optical pickup
100
1 sector = 2KB
1 ECC block = 16 sectors

Fig. 5

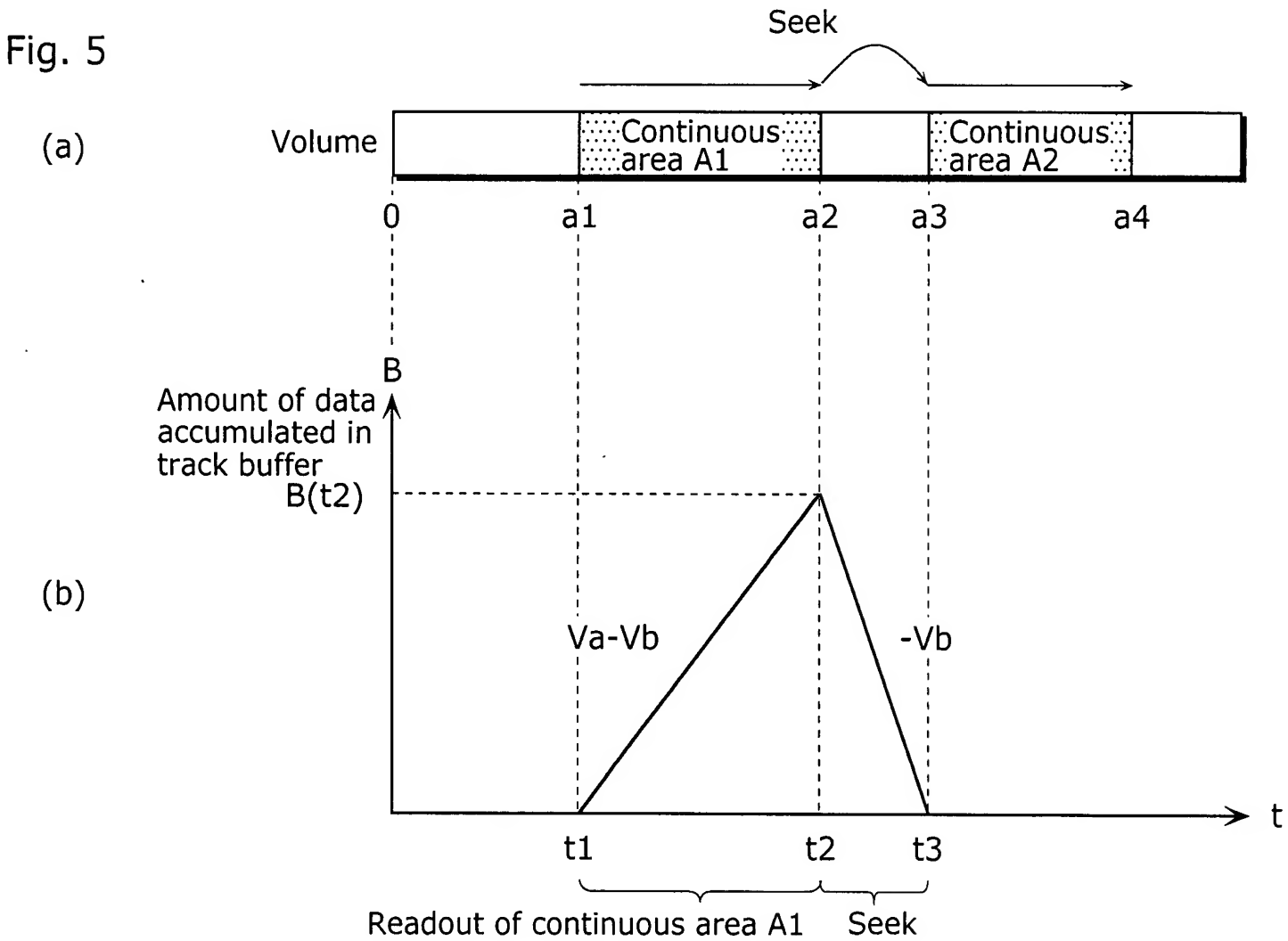

(a)
Seek
Volume
Continuous area A1
Continuous area A2
0
a1
a2
a3
a4
(b)
B
Amount of data accumulated in track buffer
B(t2)
Va-Vb
-Vb
t
t1
t2
t3
Readout of continuous area A1
Seek

Fig. 6

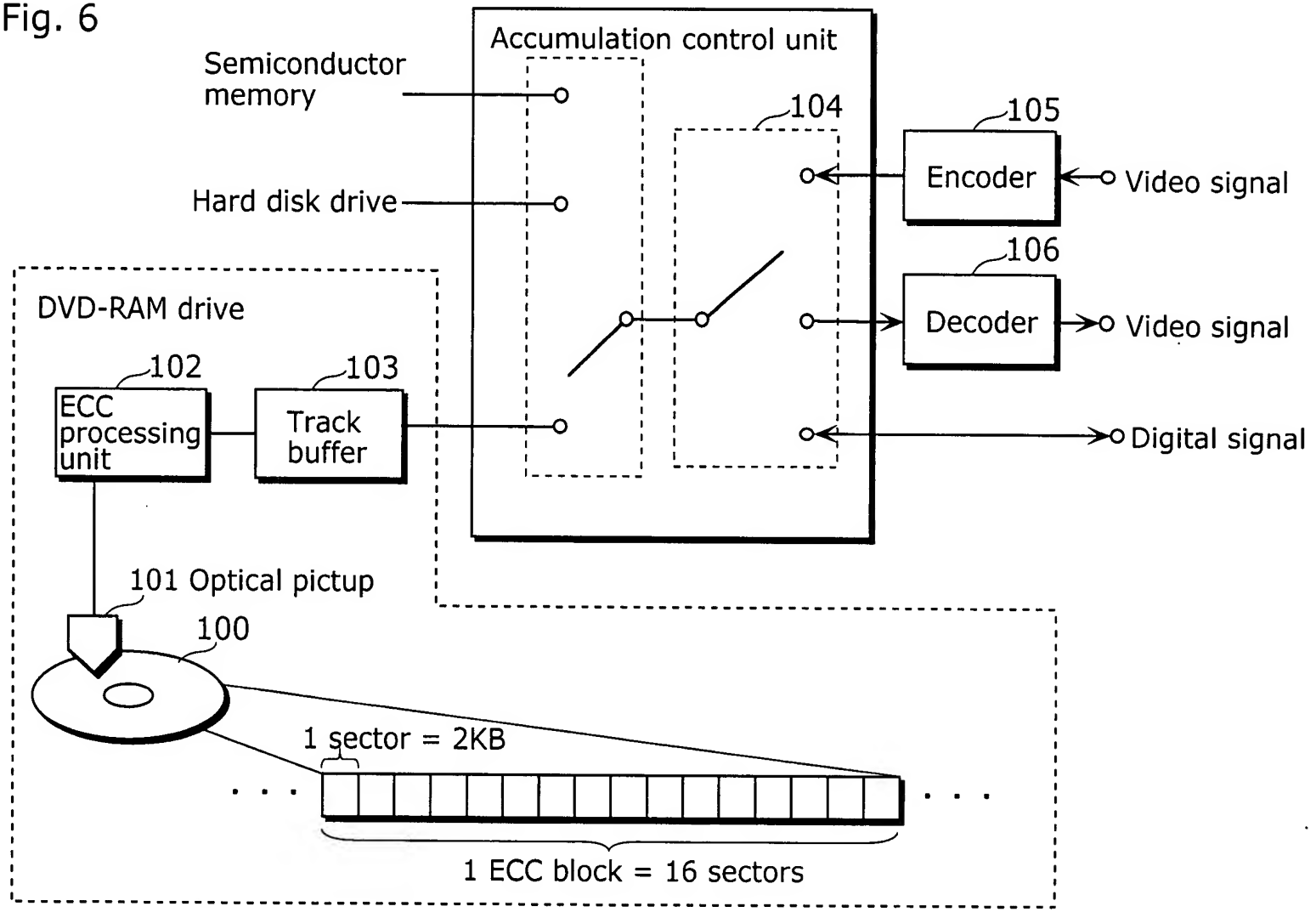

Accumulation control unit
Semiconductor memory
Hard disk drive
104
105
Encoder
Video signal
106
Decoder
Video signal
Digital signal
DVD-RAM drive
102
ECC processing unit
103
Track buffer
101 Optical pictup
100
1 sector = 2KB
1 ECC block = 16 sectors

Fig. 7A

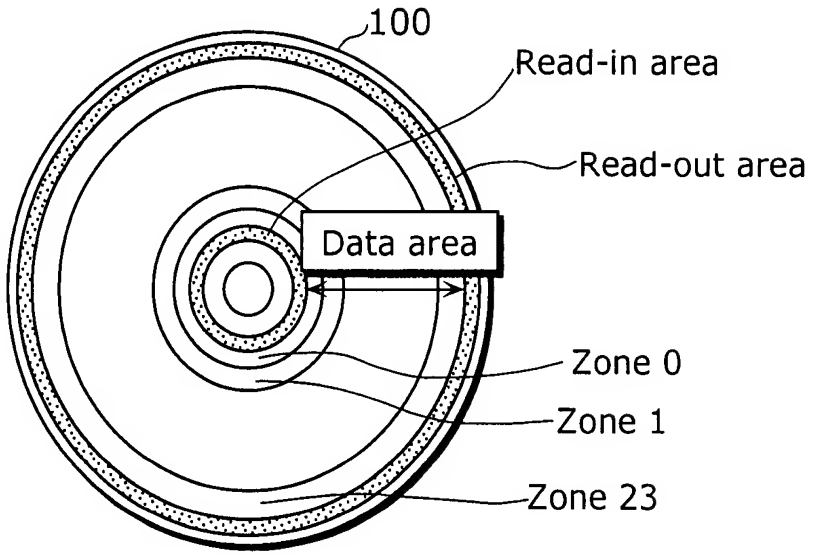

100
Read-in area
Read-out area
Data area
Zone 0
Zone 1
Zone 23

Fig. 7B

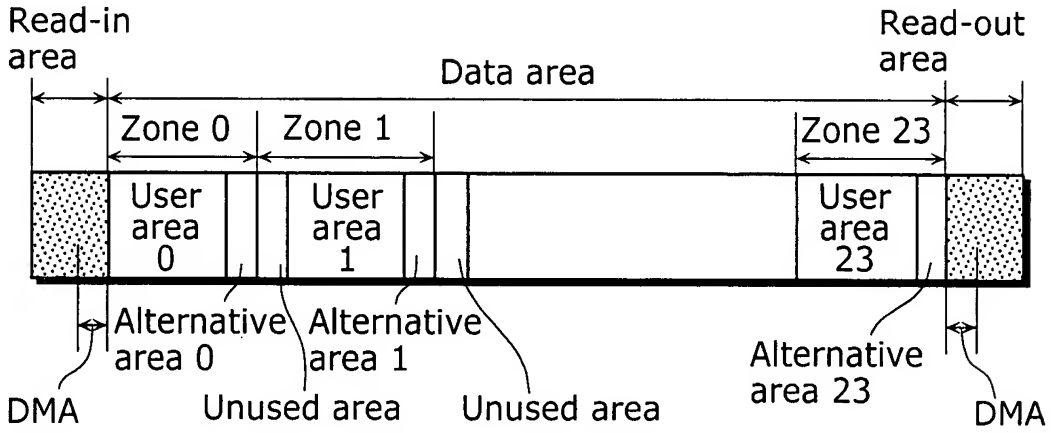

Read-in area
Data area
Read-out area
Zone 0
Zone 1
Zone 23
User area 0
User area 1
User area 23
Alternative area 0
Alternative area 1
Alternative area 23
DMA
Unused area
Unused area
DMA

Fig. 8A

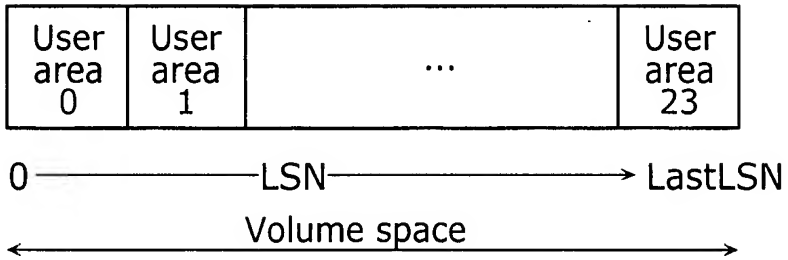

User area 0
User area 1
...
User area 23
0
LSN
LastLSN
Volume space

Fig. 8B

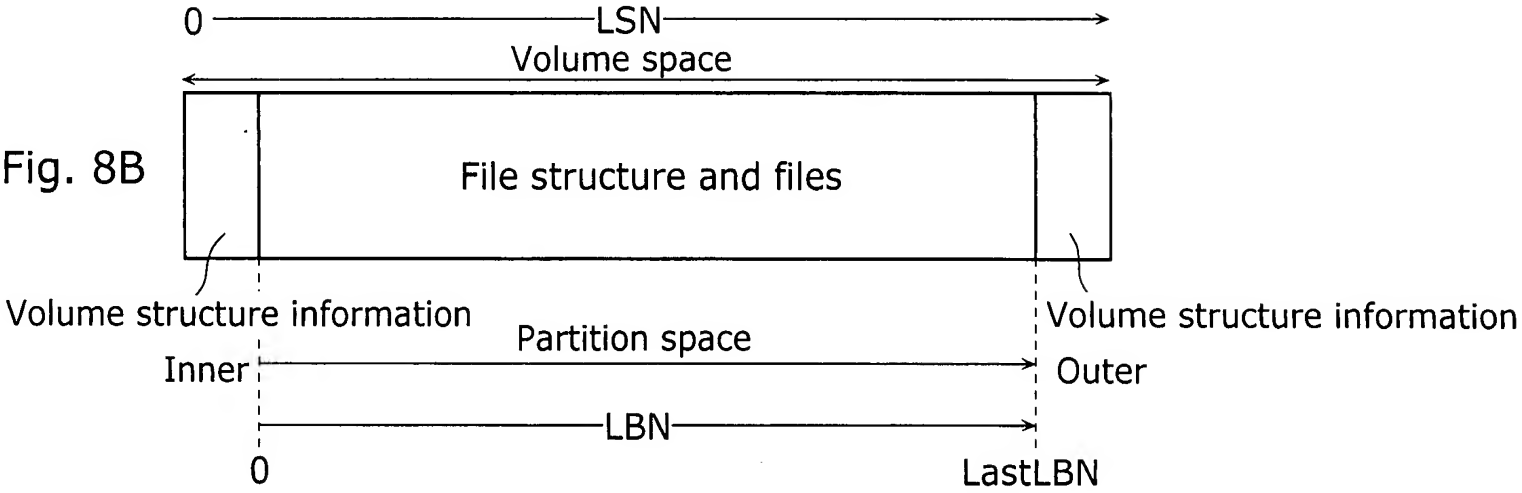

0
LSN
Volume space
File structure and files
Volume structure information
Volume structure information
Partition space
Inner
Outer
LBN
0
LastLBN

Fig. 9

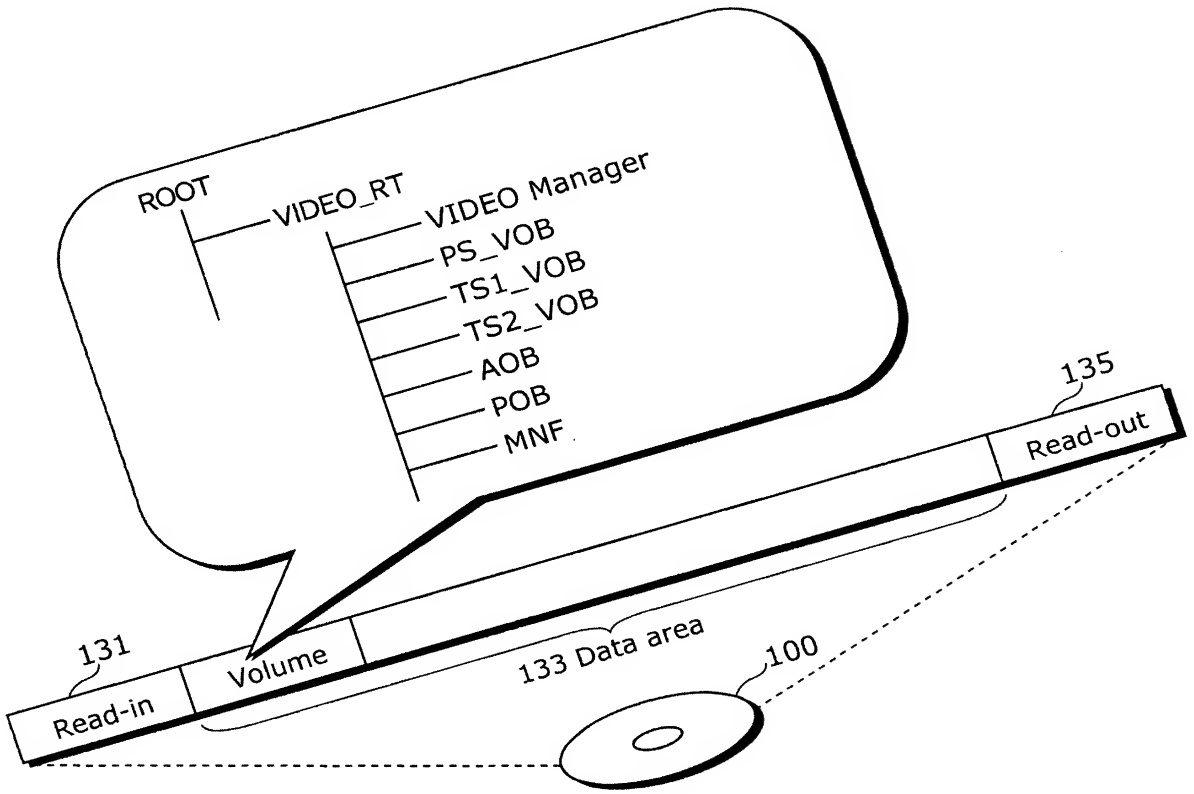

ROOT
VIDEO_RT
VIDEO Manager
PS_VOB
TS1_VOB
TS2_VOB
AOB
POB
MNF
135
Read-out
131
Read-in
Volume
133 Data area
100

Fig. 10

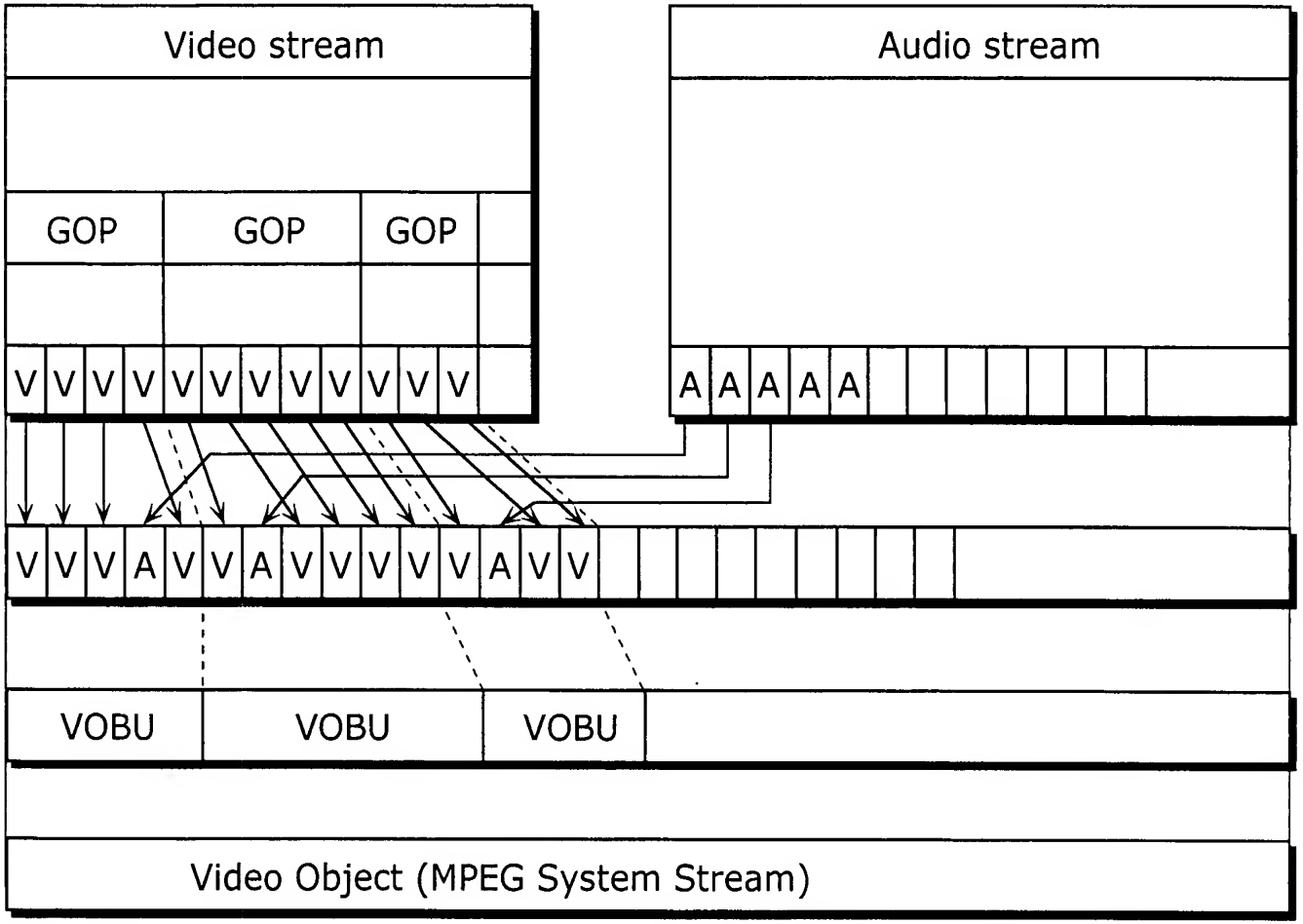

Video stream
Audio stream
GOP
GOP
GOP
V V V V V V V V V V V V
A A A A A
V V V A V V A V V V V V A V V
VOBU
VOBU
VOBU
Video Object (MPEG System Stream)

Fig. 11

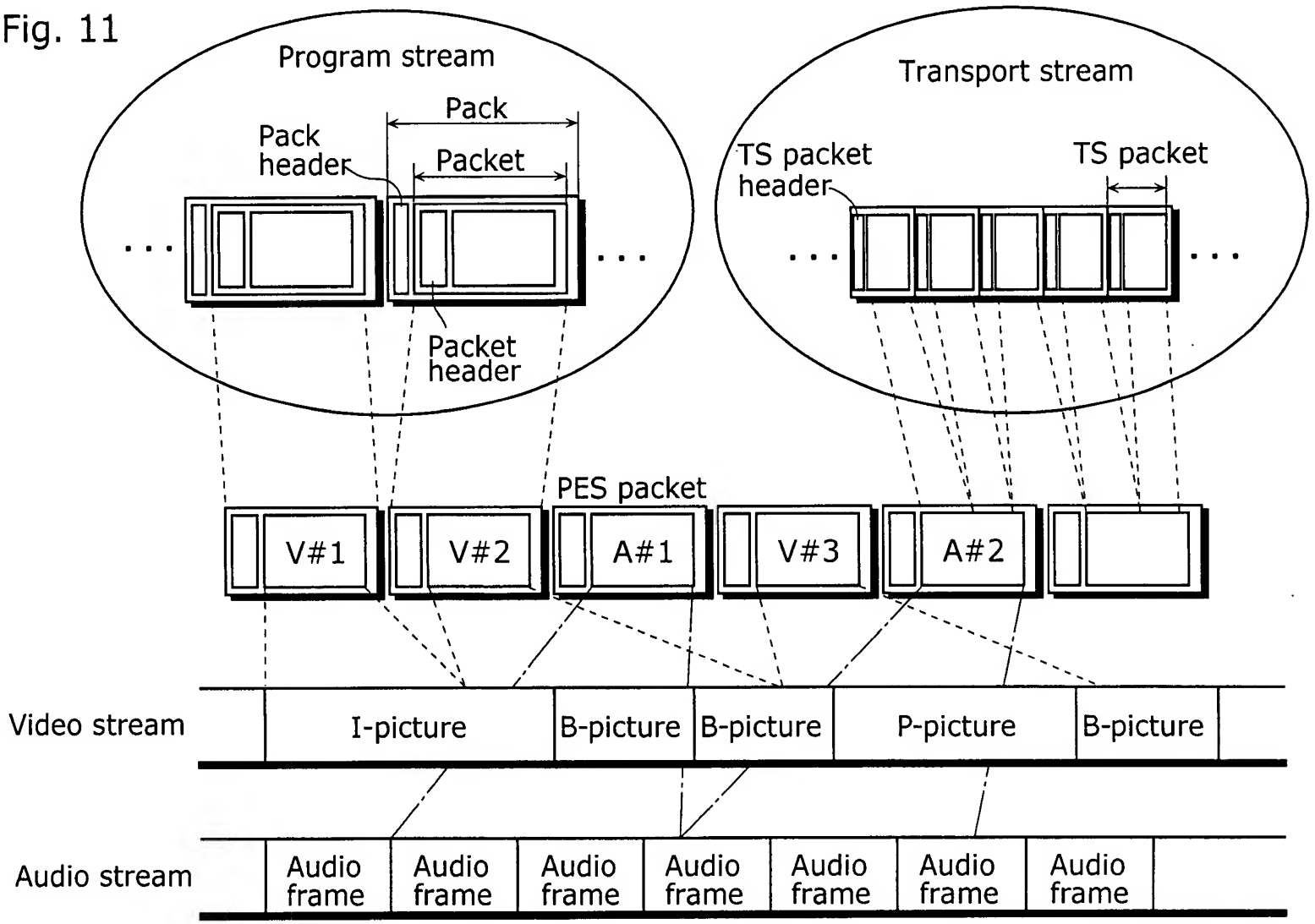

Program stream
Pack
Pack header
Packet
Packet header
Transport stream
TS packet header
TS packet
PES packet
V#1
V#2
A#1
V#3
A#2
Video stream
I-picture
B-picture
B-picture
P-picture
B-picture
Audio stream
Audio frame
Audio frame
Audio frame
Audio frame
Audio frame
Audio frame
Audio frame

Fig. 12

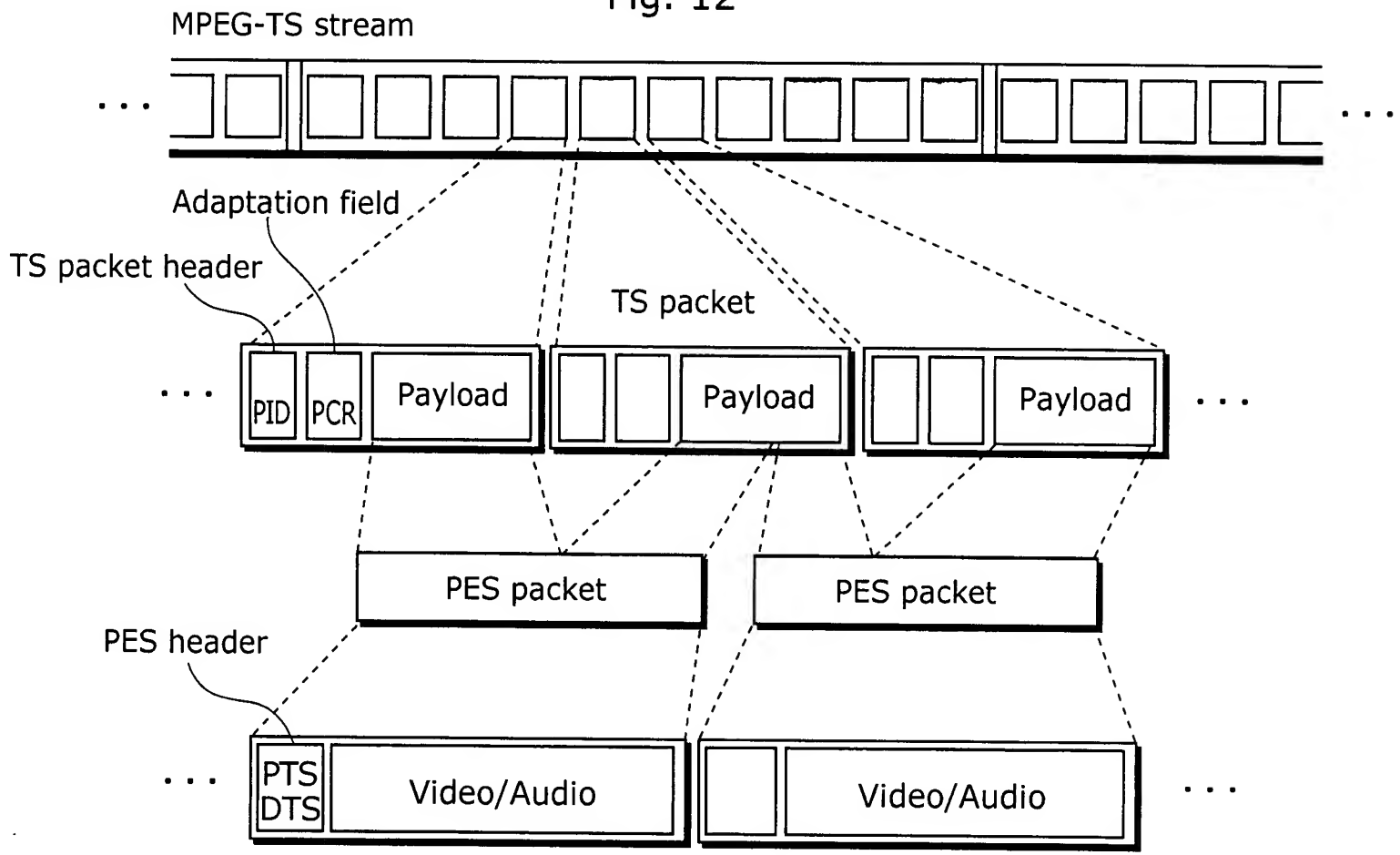

MPEG-TS stream
Adaptation field
TS packet header
TS packet
PID
PCR
Payload
Payload
Payload
PES packet
PES packet
PES header
PTS
DTS
Video/Audio
Video/Audio

Fig. 13

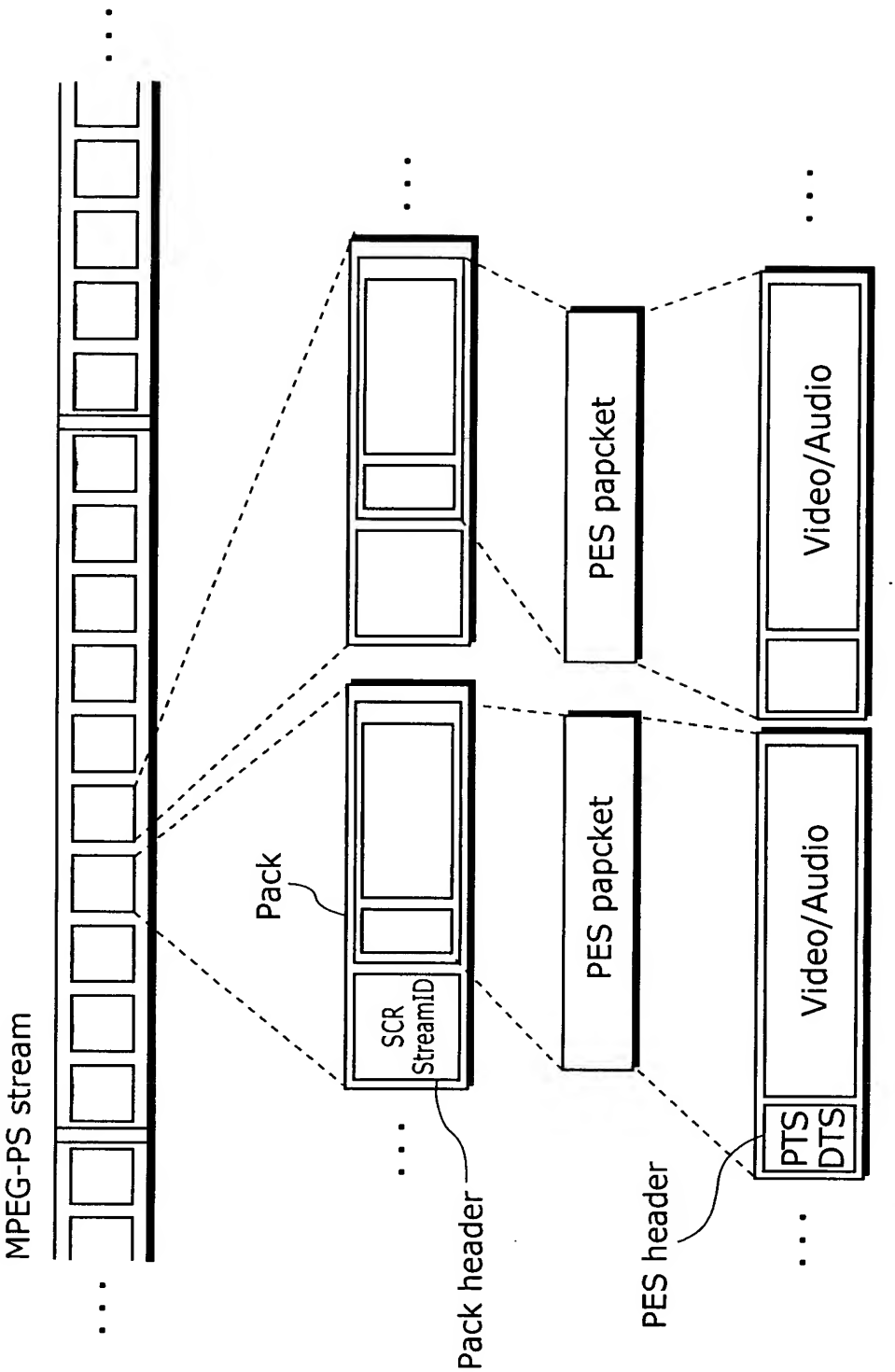
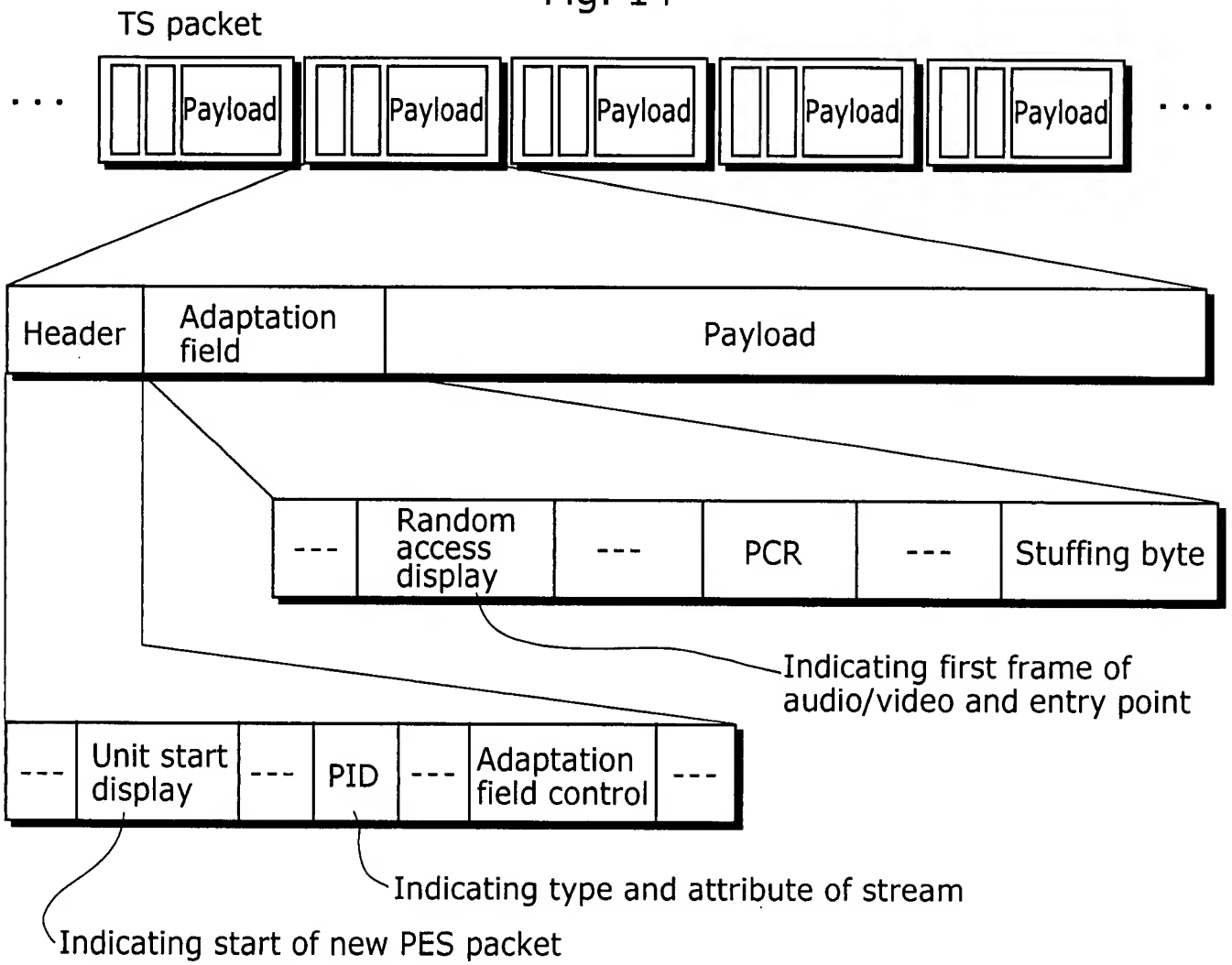

MPEG-PS stream
Pack
SCR
StreamID
Pack header
PES papcket
PES papcket
PES header
Video/Audio
Video/Audio
PTS
DTS

Fig. 14


TS packet
Payload
Payload
Payload
Payload
Payload
Header
Adaptation field
Payload

Random access display

PCR

Stuffing byte
Indicating first frame of audio/video and entry point

Unit start display

PID

Adaptation field control

Indicating type and attribute of stream
Indicating start of new PES packet

Fig. 15

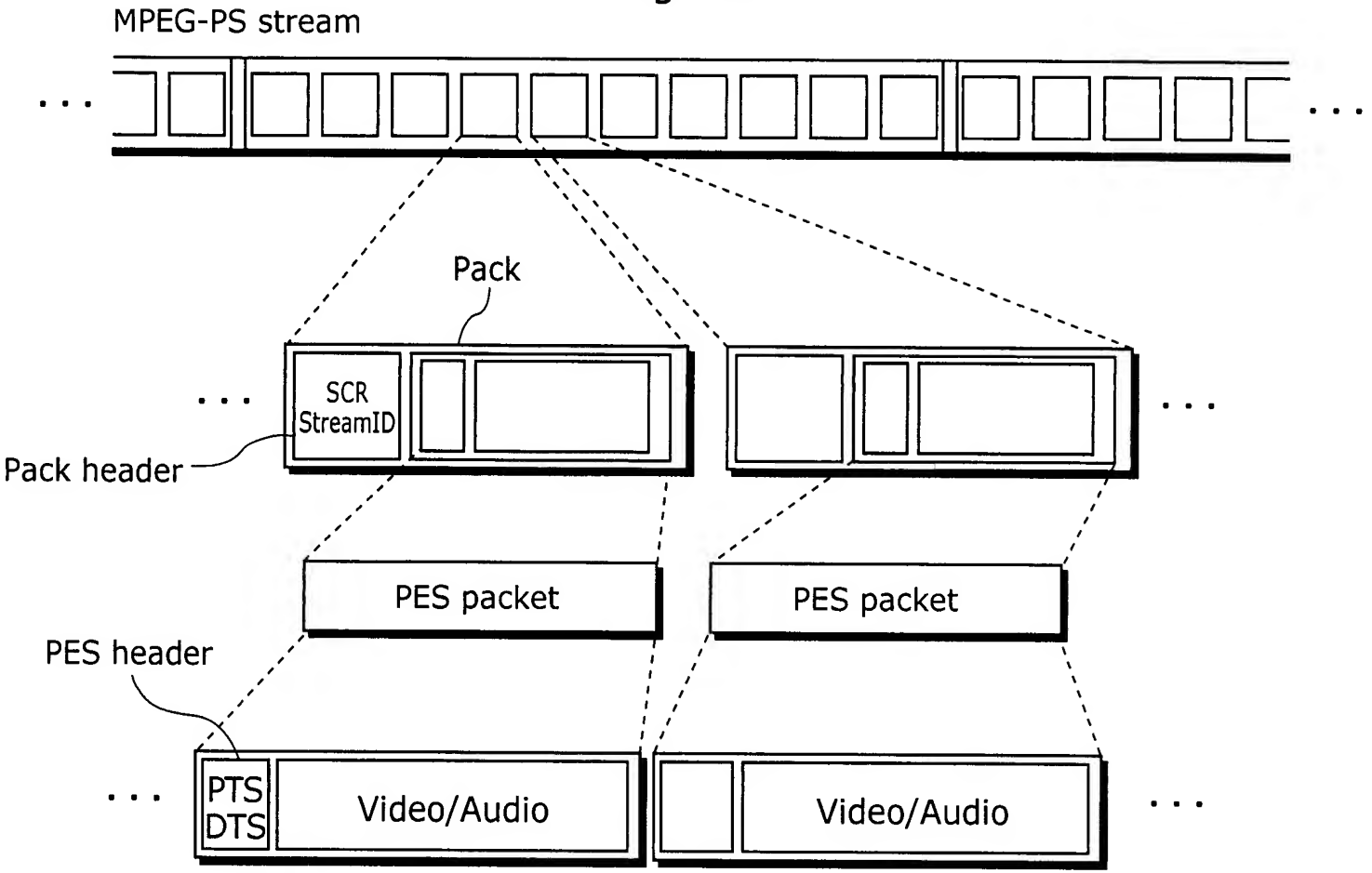

MPEG-PS stream
Pack
SCR
StreamID
Pack header
PES packet
PES packet
PES header
PTS
DTS
Video/Audio
Video/Audio

Fig. 16A

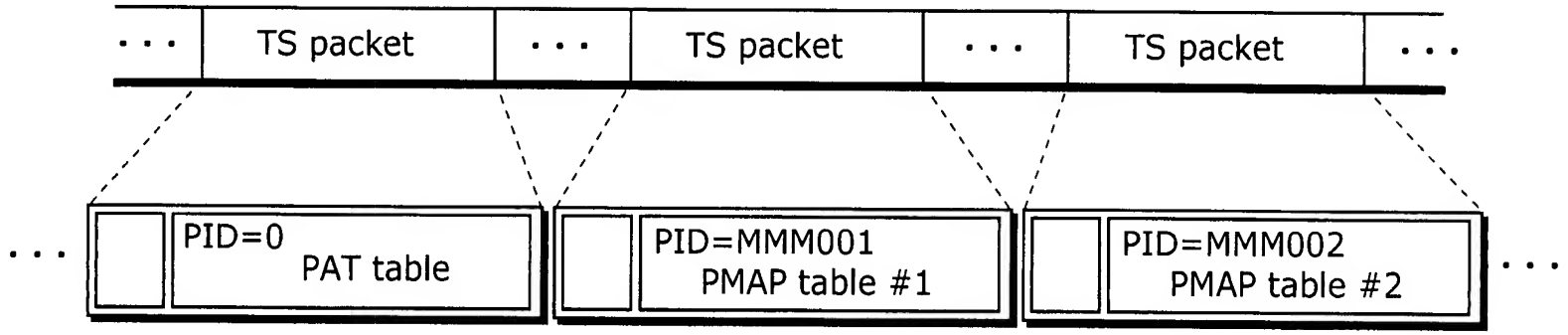


Fig. 16B

PAT table

Program 1	PMAP table #1
Program 2	PMAP table #2
Program n	PMAP table #n

Fig. 16C

PMAP table #1

Video	PID=vv001
Audio	PID=aa002

Fig. 16D

PMAP table #2

Video	PID=vv002
Audio	PID=aa001

Fig. 17

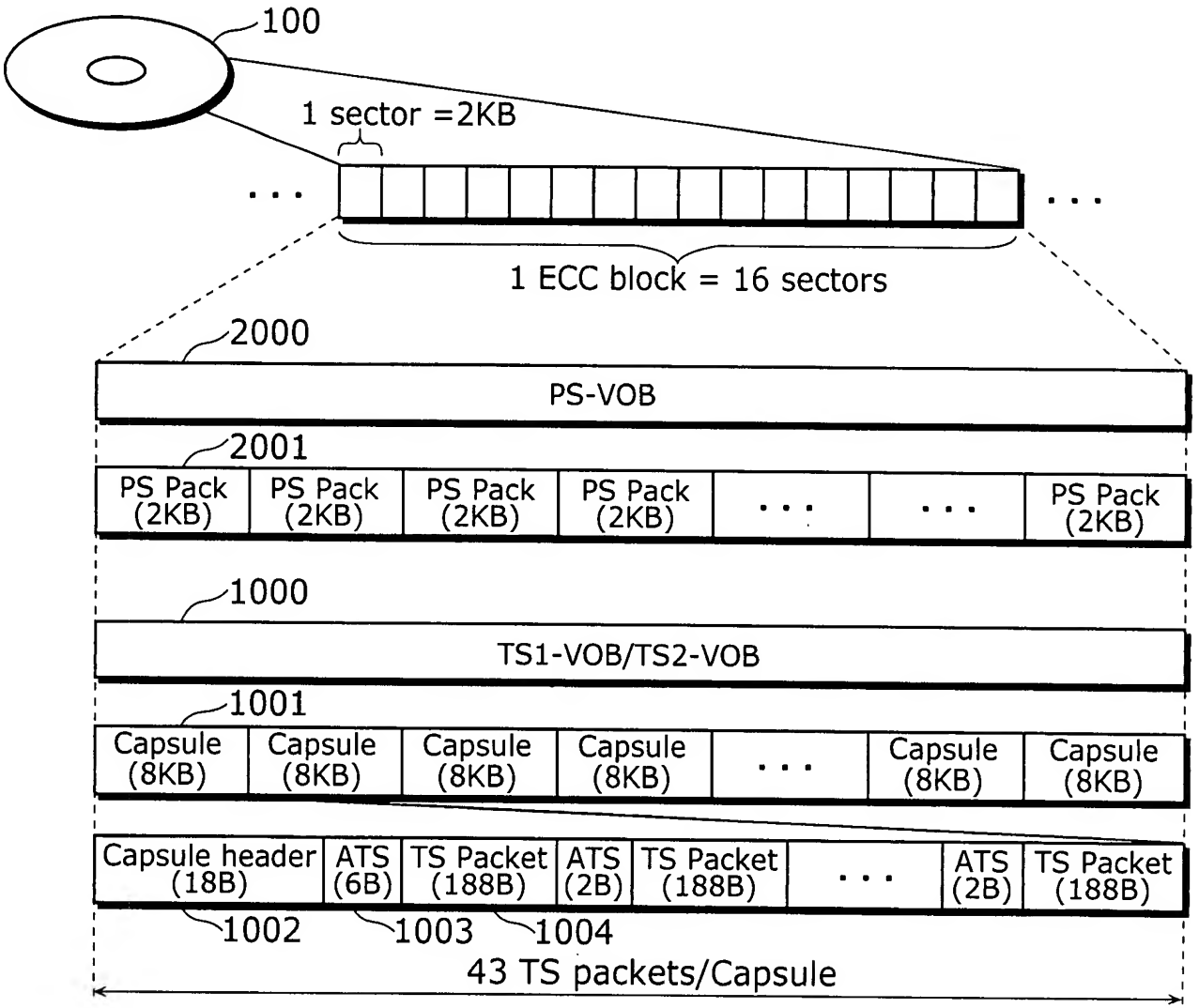

(a)
100
1 sector =2KB
1 ECC block = 16 sectors
(b)
2000
PS-VOB
2001
PS Pack (2KB)
PS Pack (2KB)
PS Pack (2KB)
PS Pack (2KB)
PS Pack (2KB)
(c)
1000
TS1-VOB/TS2-VOB
1001
Capsule (8KB)
Capsule (8KB)
Capsule (8KB)
Capsule (8KB)
Capsule (8KB)
Capsule (8KB)
Capsule header (18B)
ATS (6B)
TS Packet (188B)
ATS (2B)
TS Packet (188B)
ATS (2B)
TS Packet (188B)
1002
1003
1004
43 TS packets/Capsule

Fig. 18A

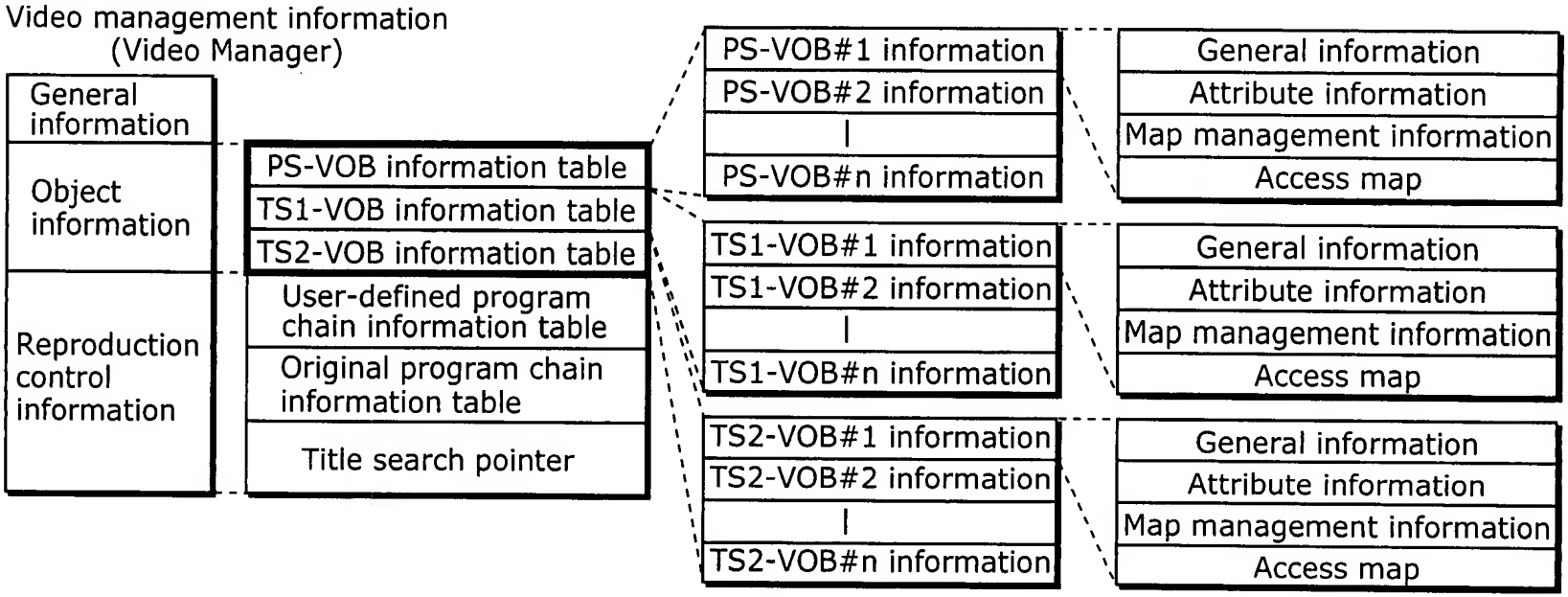


Fig. 18B

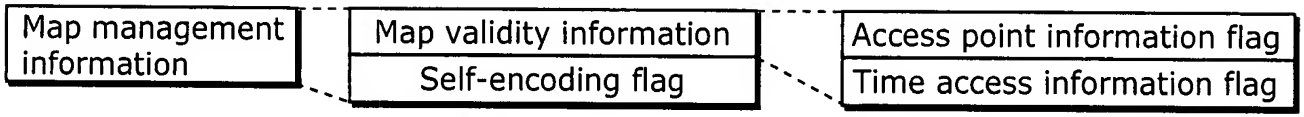


Fig. 19A

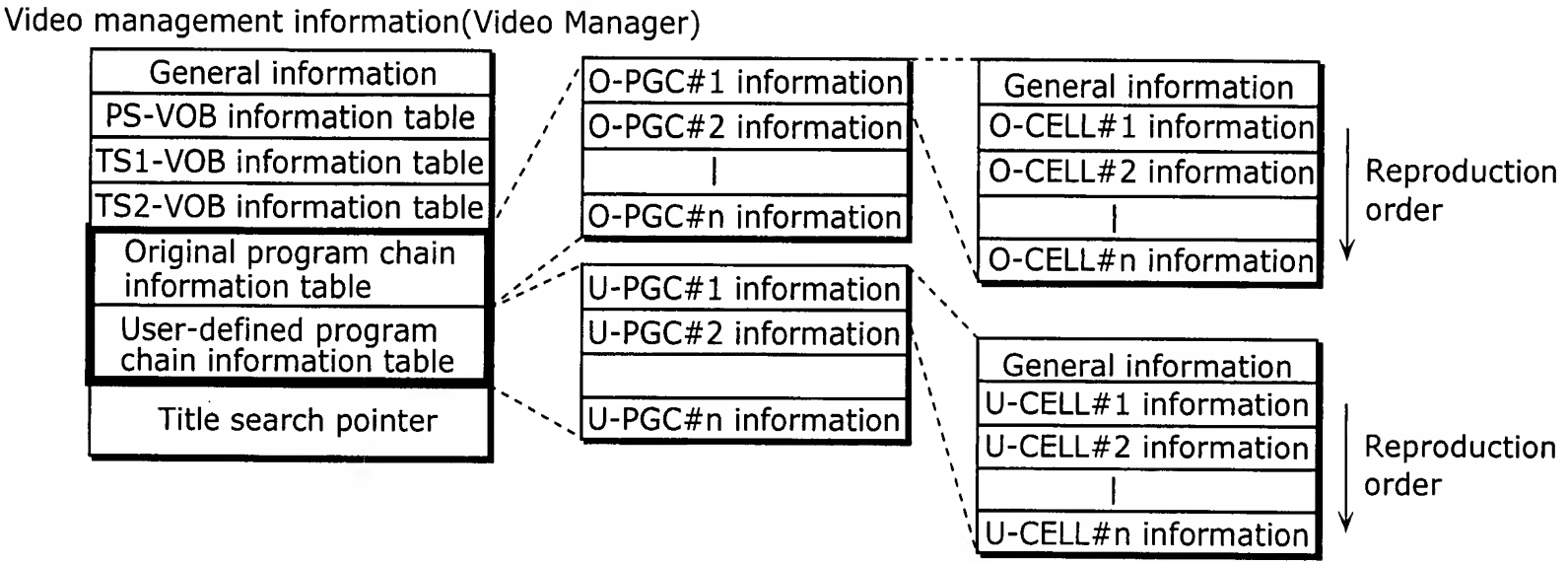


Fig. 19B

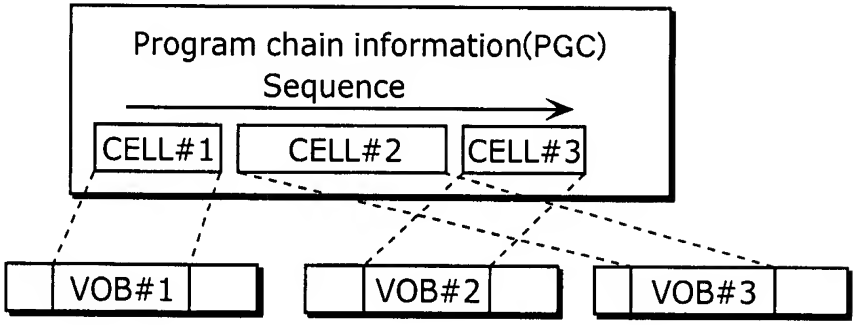


Fig. 20

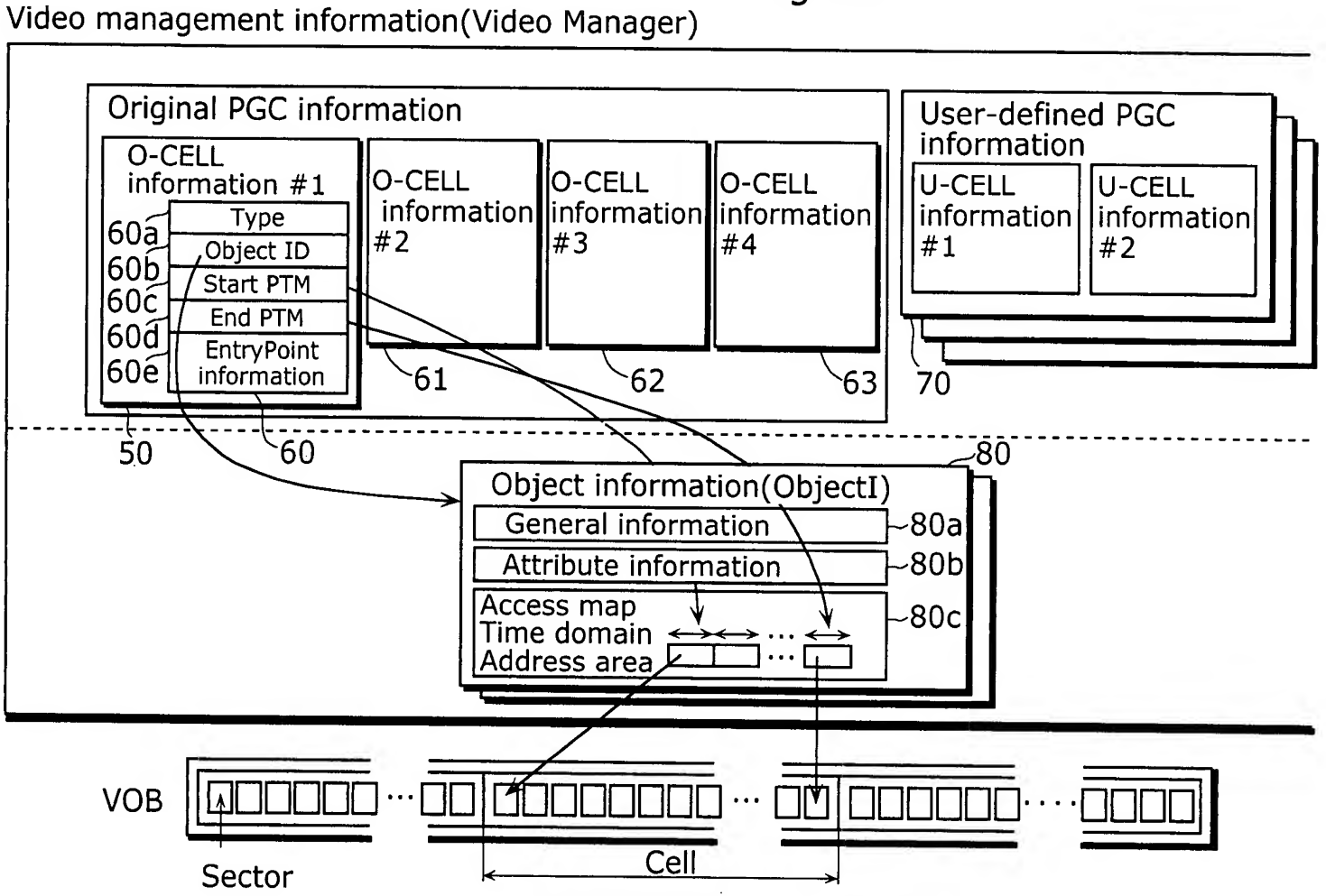

Video management information(Video Manager)
Original PGC information
O-CELL information #1
Type
Object ID
Start PTM
End PTM
EntryPoint information
60a
60b
60c
60d
60e
O-CELL information #2
O-CELL information #3
O-CELL information #4
61
62
63
User-defined PGC information
U-CELL information #1
U-CELL information #2
70
50
60
80
Object information(ObjectI)
General information
Attribute information
Access map
Time domain
Address area
80a
80b
80c
VOB
Sector
Cell

Fig. 21

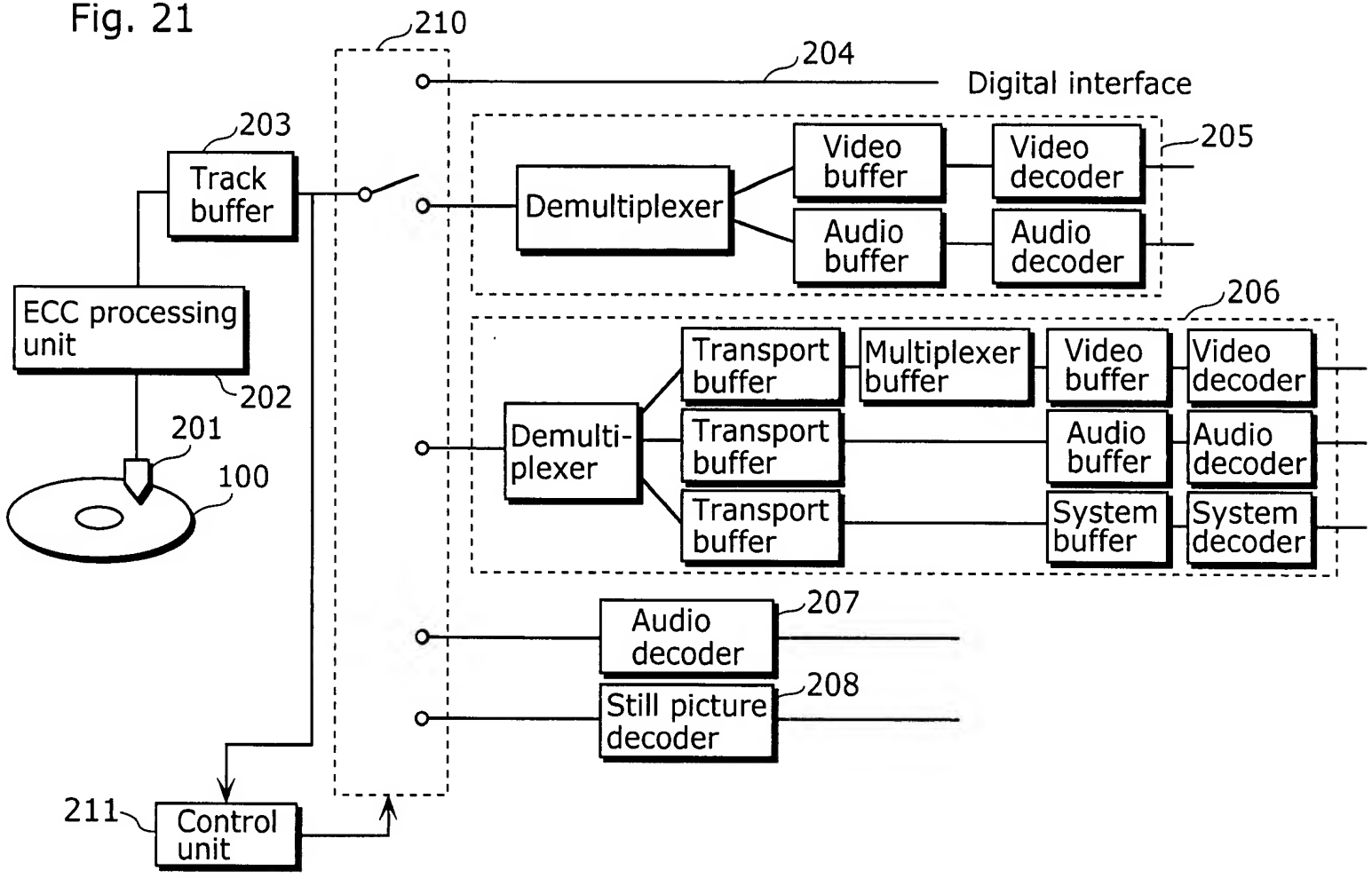

210
204
Digital interface
203
Track buffer
Demultiplexer
Video buffer
Video decoder
205
Audio buffer
Audio decoder
ECC processing unit
202
206
201
100
Transport buffer
Multiplexer buffer
Video buffer
Video decoder
Demulti-plexer
Transport buffer
Audio buffer
Audio decoder
Transport buffer
System buffer
System decoder
207
Audio decoder
208
Still picture decoder
211
Control unit

Fig. 22

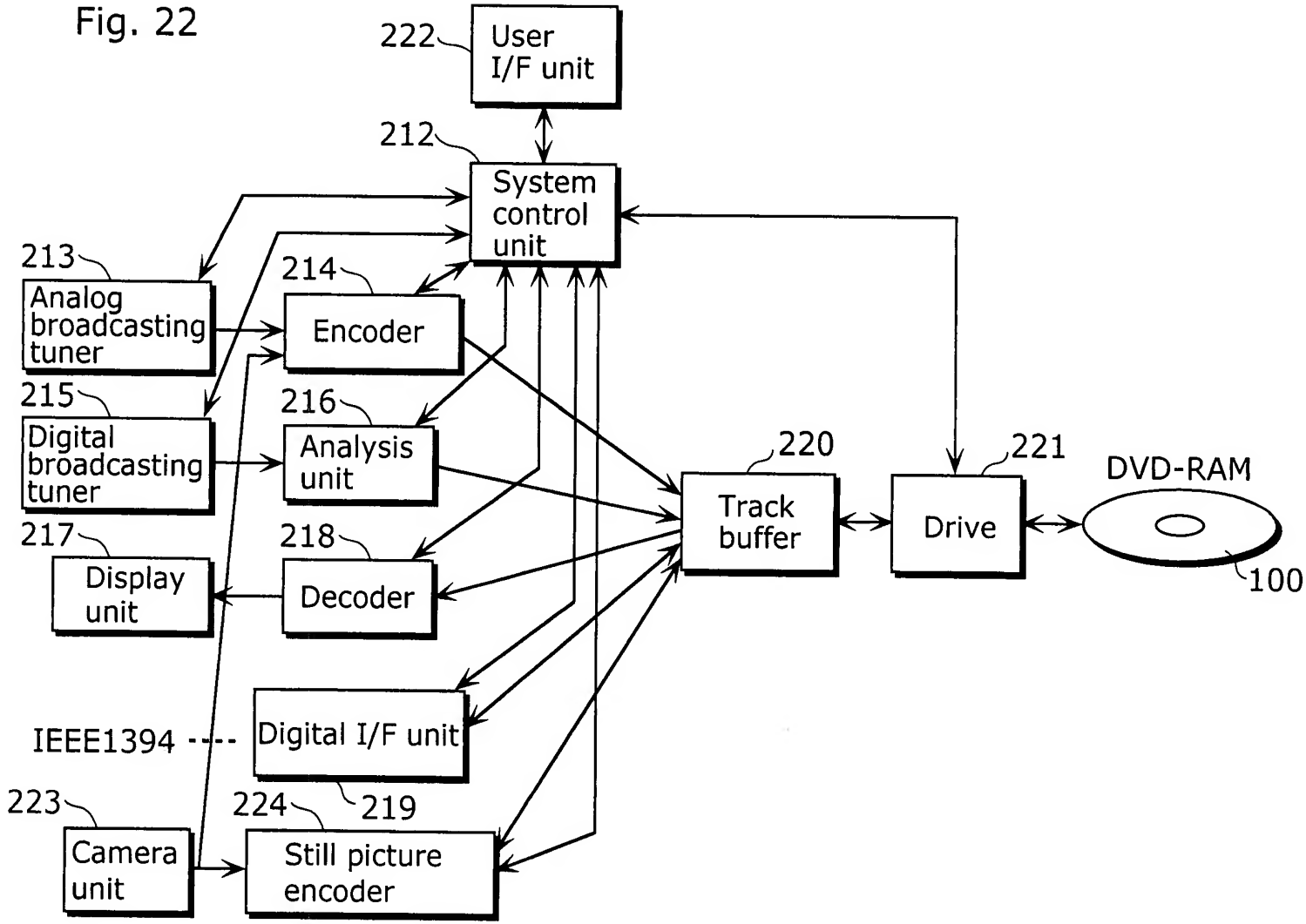

222
User I/F unit
212
System control unit
213
Analog broadcasting tuner
214
Encoder
215
Digital broadcasting tuner
216
Analysis unit
220
221
DVD-RAM
Track buffer
Drive
217
Display unit
218
Decoder
100
IEEE1394
Digital I/F unit
219
223
224
Camera unit
Still picture encoder

Fig. 23

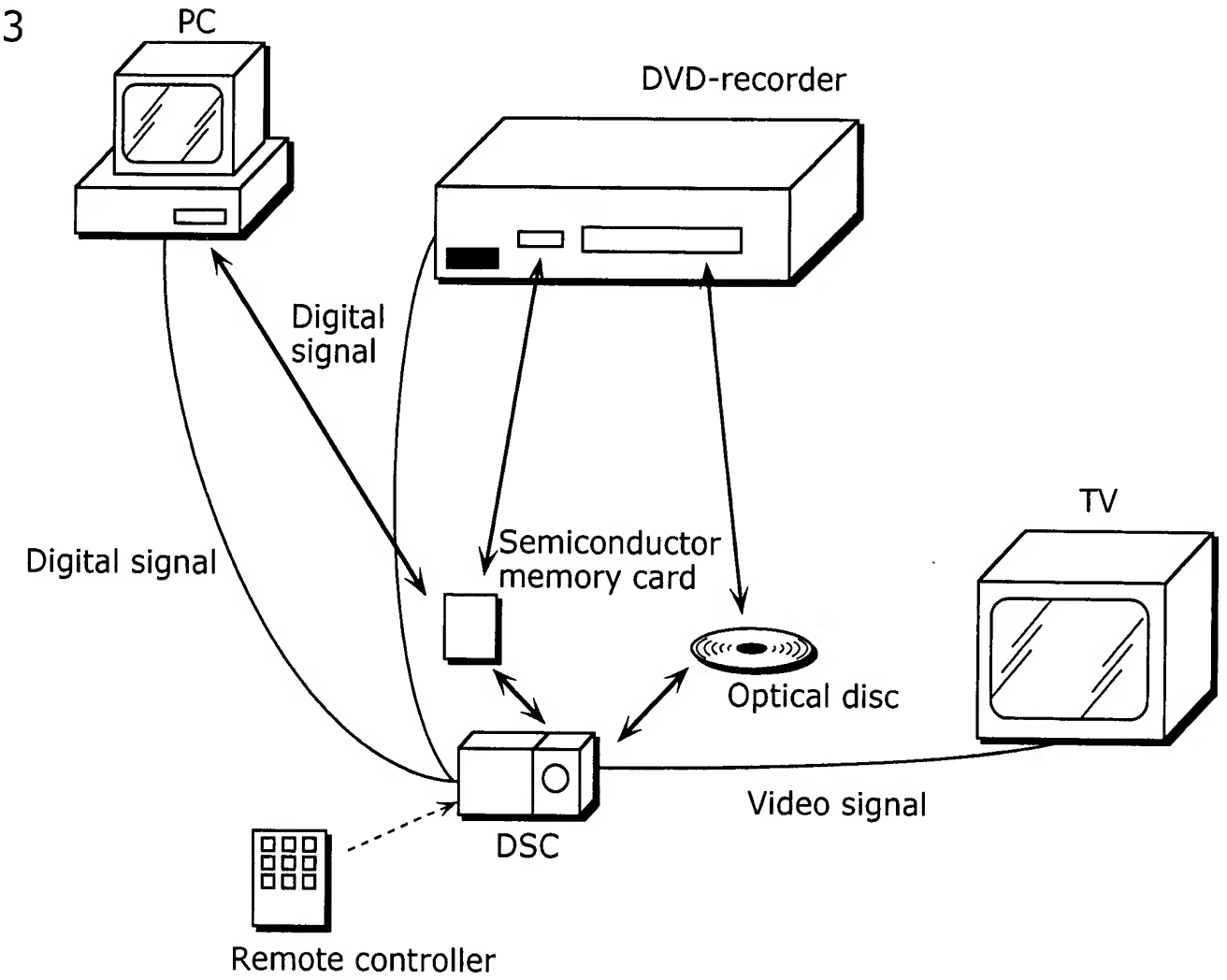

PC
DVD-recorder
Digital signal
Digital signal
Semiconductor memory card
TV
Optical disc
Video signal
DSC
Remote controller

Fig. 24A

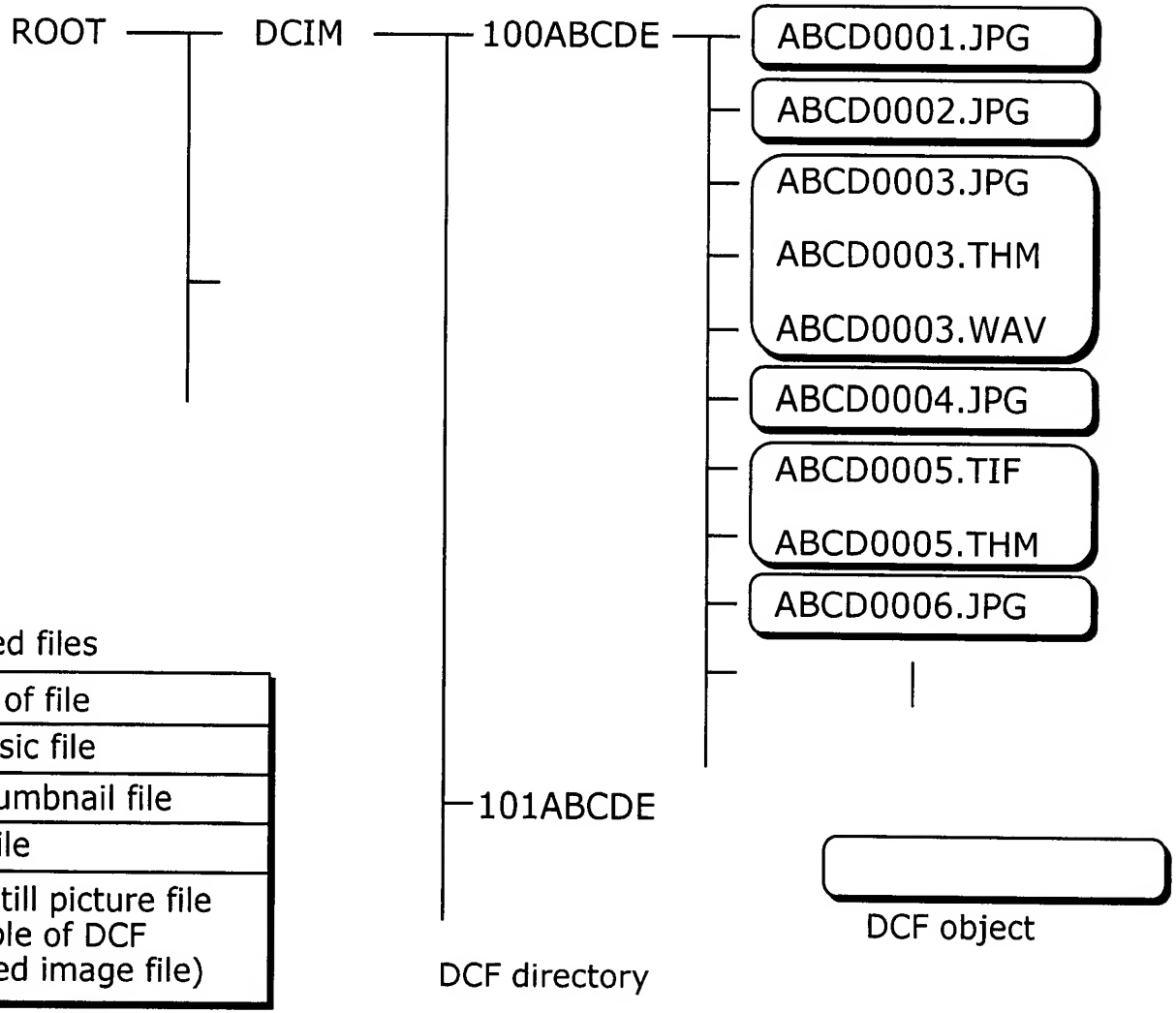


Fig. 24B

Still picture related files

Extension	Details of file
JPG	DCF basic file
THM	DCF thumbnail file
WAV	Audio file
TIF	Other still picture file (Example of DCF extended image file)

Fig. 25

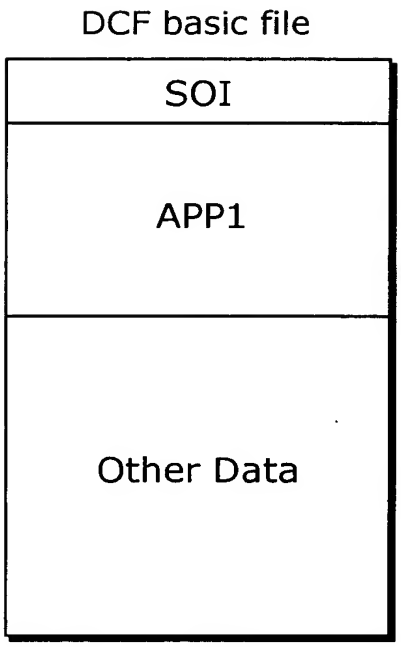


Fig. 26

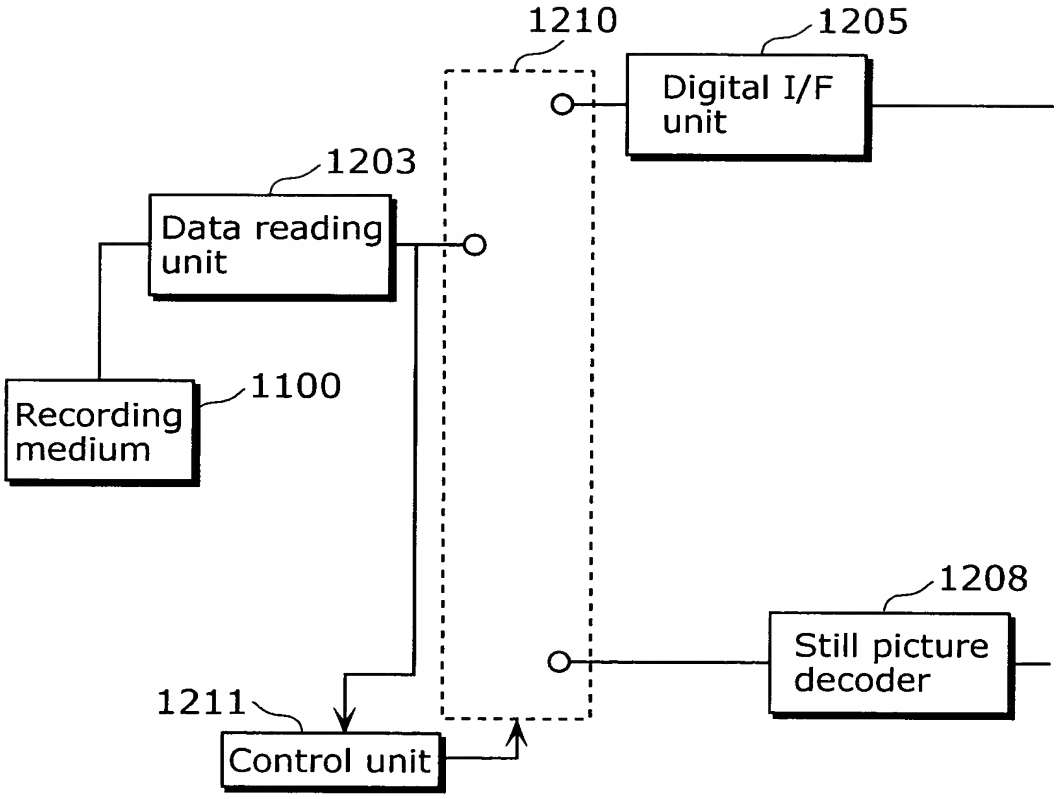

1210
1205
Digital I/F unit
1203
Data reading unit
Recording medium
1100
1208
Still picture decoder
1211
Control unit

Fig. 27

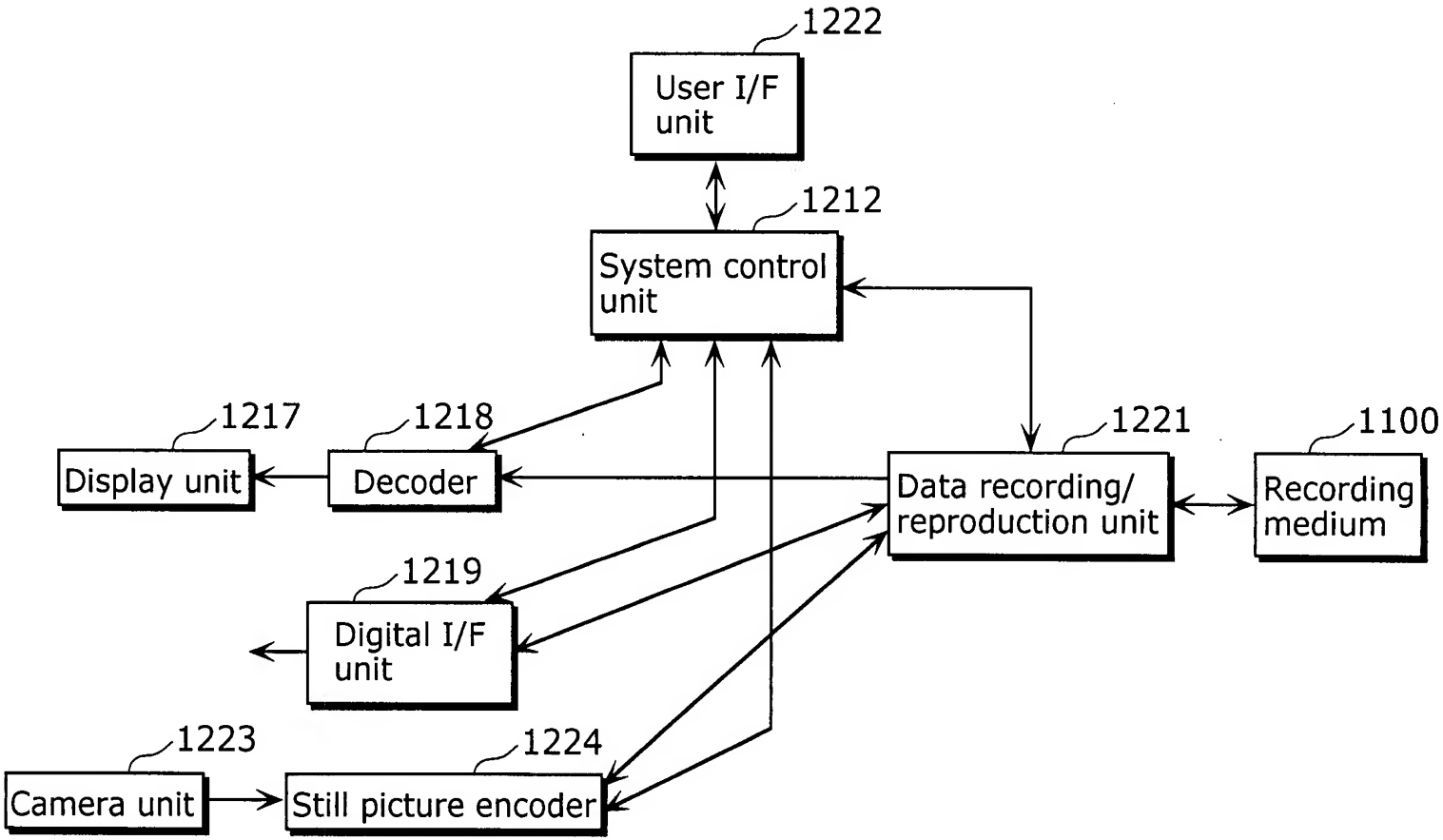
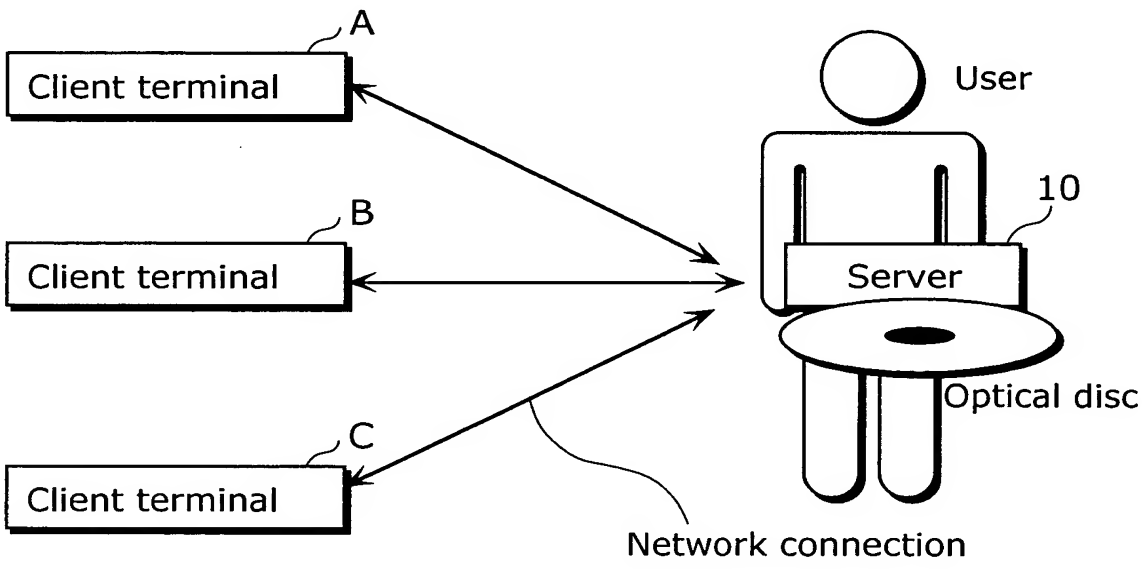

1222
User I/F unit
1212
System control unit
1217
Display unit
1218
Decoder
1221
Data recording/ reproduction unit
1100
Recording medium
1219
Digital I/F unit
1223
Camera unit
1224
Still picture encoder

Fig. 28


A
Client terminal
B
Client terminal
C
Client terminal
User
10
Server
Optical disc
Network connection

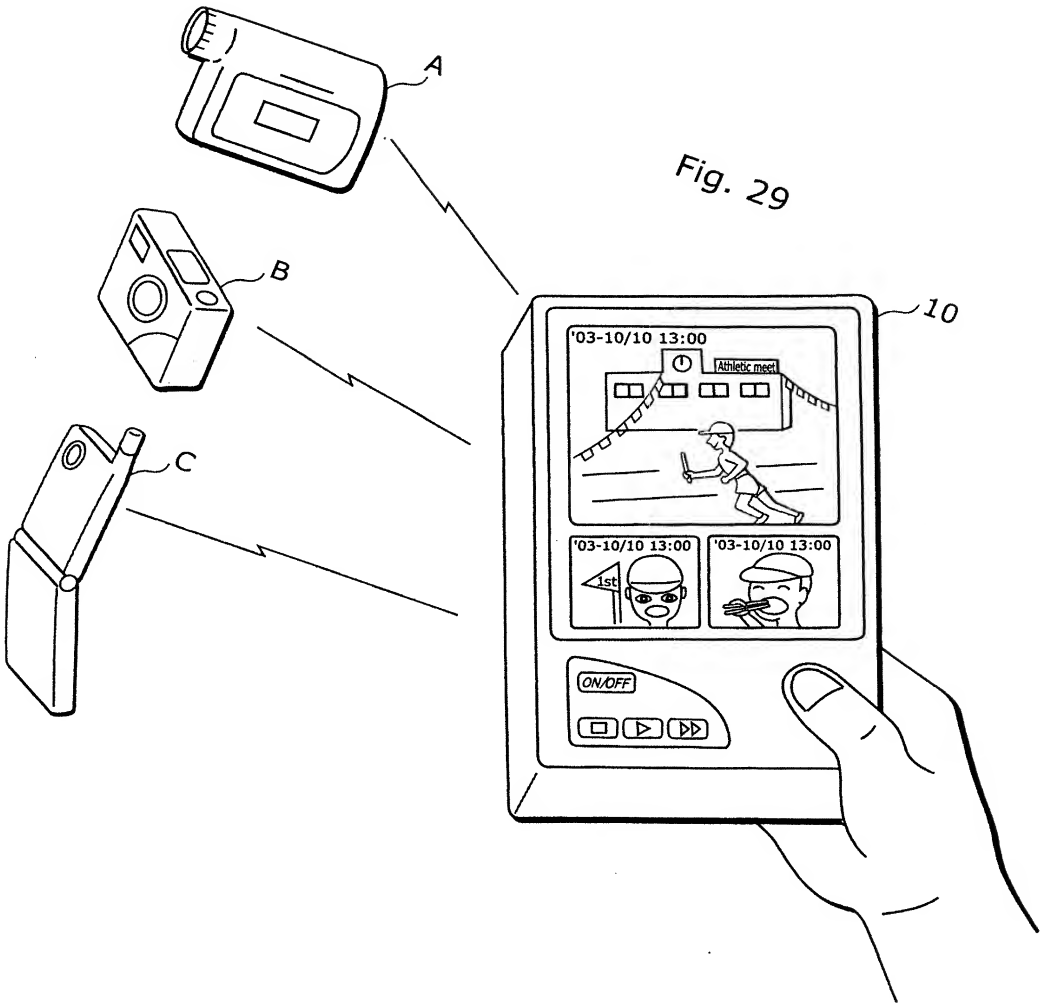

A
B
C
10
'03-10/10 13:00
Athletic meet
'03-10/10 13:00
'03-10/10 13:00
1st
ON/OFF

Fig. 29

Fig. 30

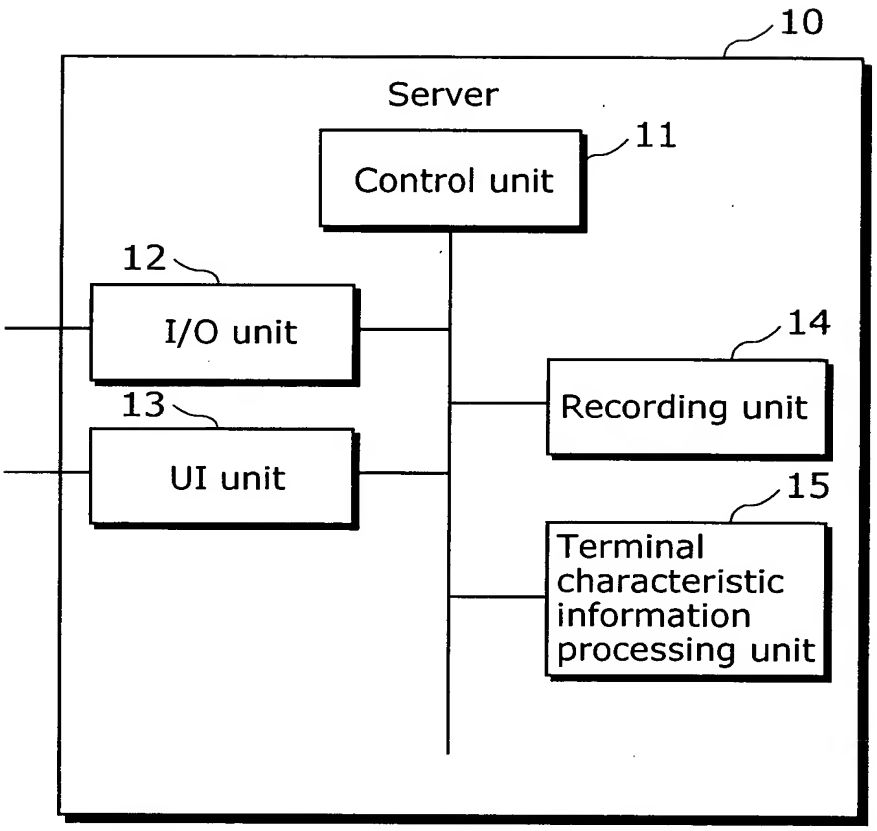

10
Server
11
Control unit
12
I/O unit
13
UI unit
14
Recording unit
15
Terminal characteristic information processing unit

Fig. 31

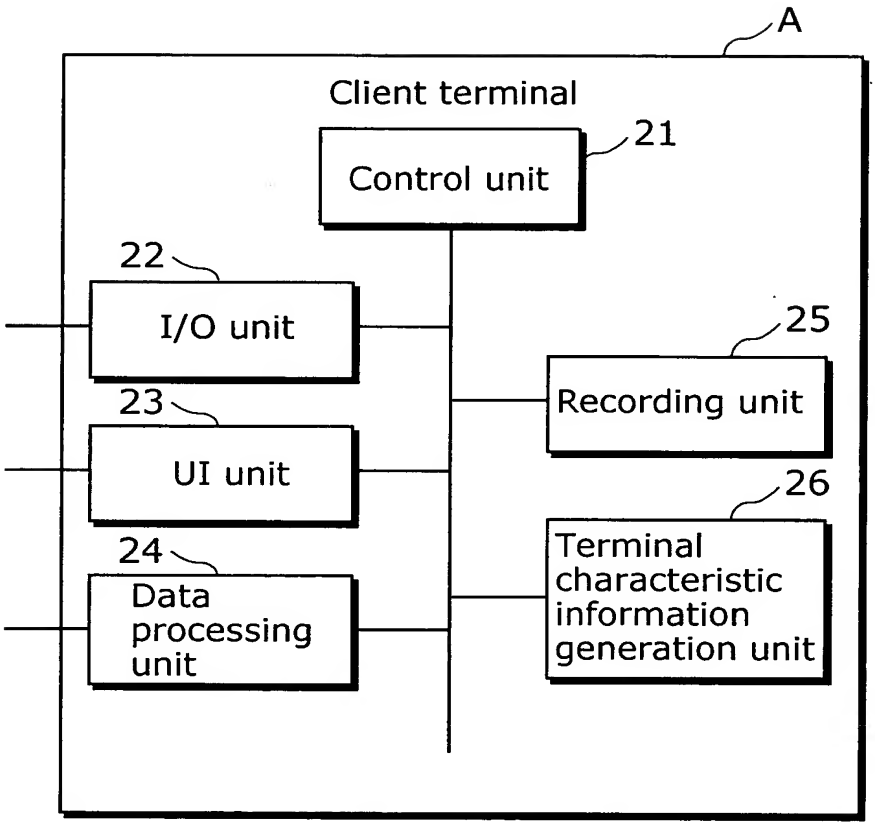

A
Client terminal
Control unit
21
22
I/O unit
23
UI unit
24
Data processing unit
25
Recording unit
26
Terminal characteristic information generation unit

Fig. 32

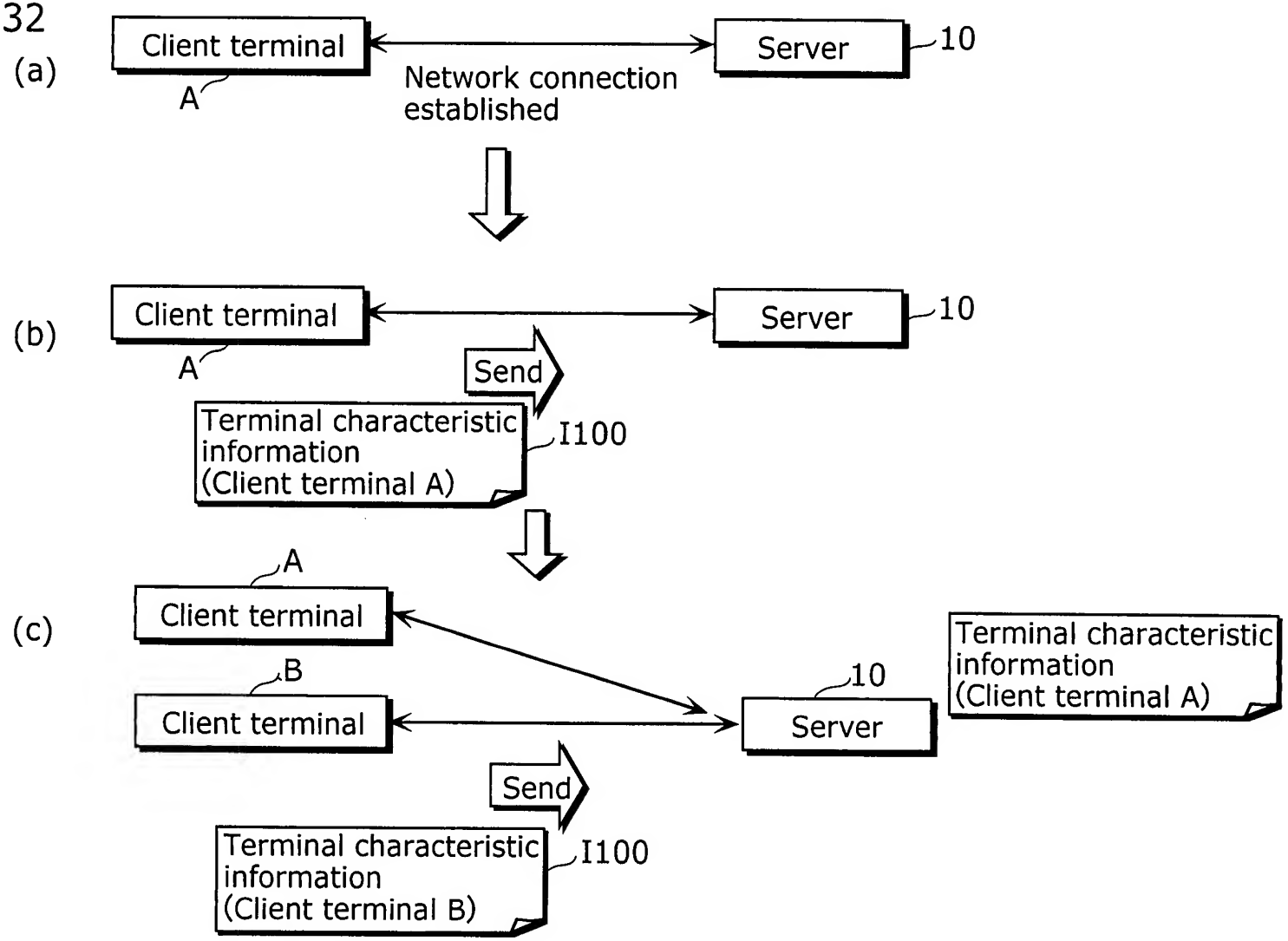

(a)
Client terminal
A
Network connection established
Server
10
(b)
Client terminal
A
Server
10
Send
Terminal characteristic information (Client terminal A)
I100
(c)
A
Client terminal
B
Client terminal
10
Server
Terminal characteristic information (Client terminal A)
Send
Terminal characteristic information (Client terminal B)
I100

Fig. 33

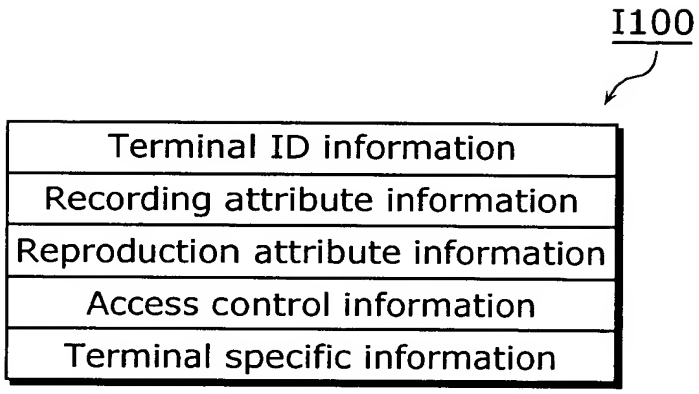

I100
Terminal ID information
Recording attribute information
Reproduction attribute information
Access control information
Terminal specific information

Fig. 34A

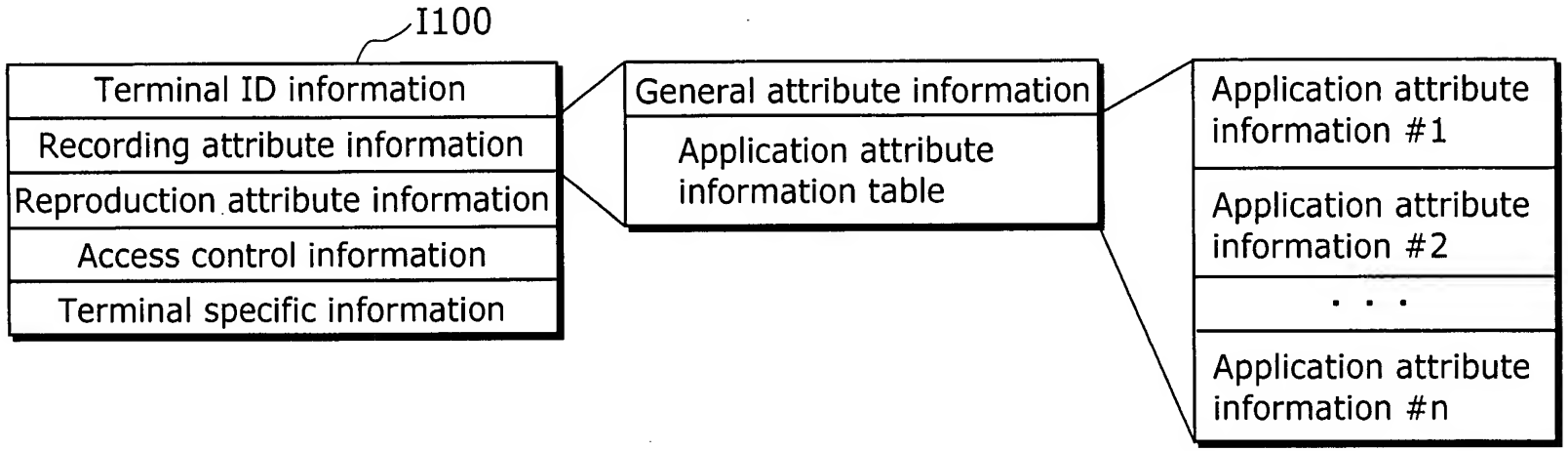


Fig. 34B

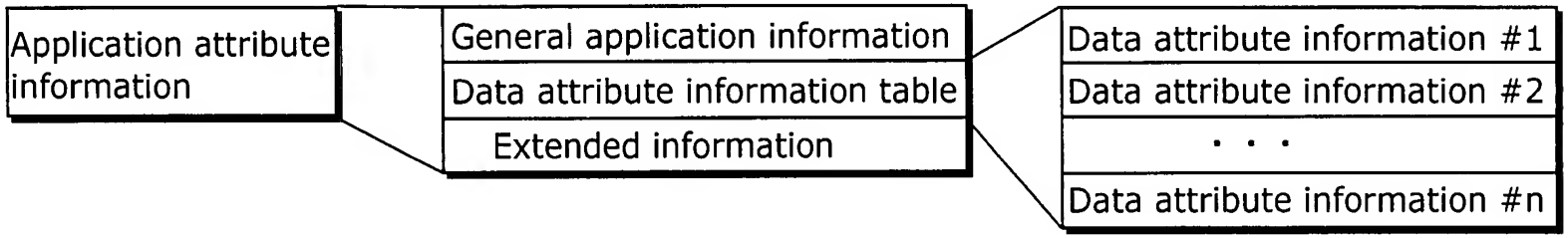


Fig. 35A

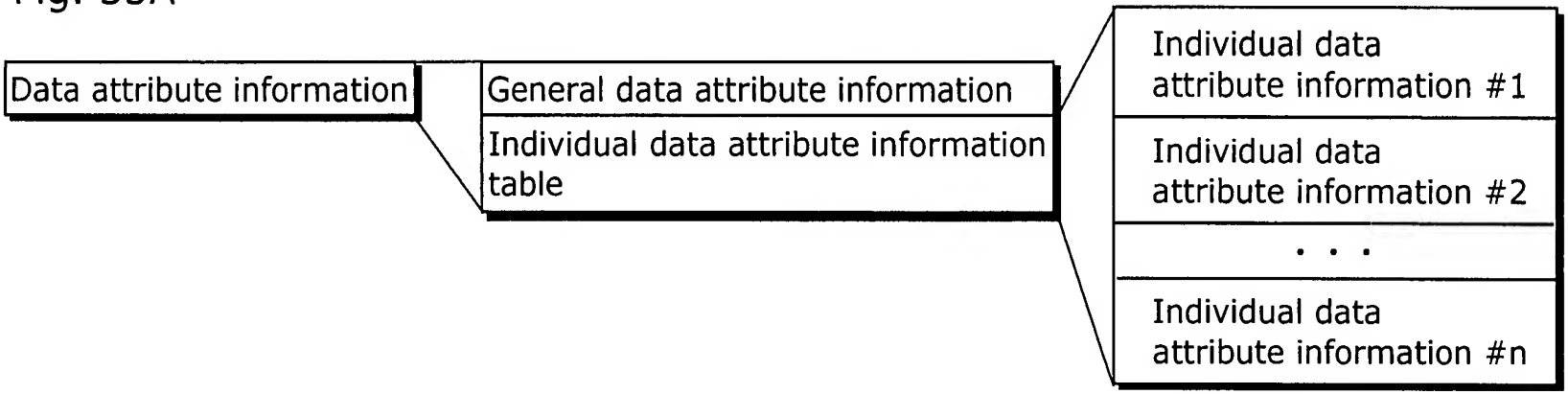


Fig. 35B

Attributes	Settable attribute values
Required band information	6 (Mbps) (Specified value)
Continuous media attribute	1: Continuous media data 0: Discrete media data
Non-retransmittable data attribute	1: Non-retransmittable data 0: Retransmittable data
Copy attribute	1: Copy data 0: Not copy data

Fig. 36A

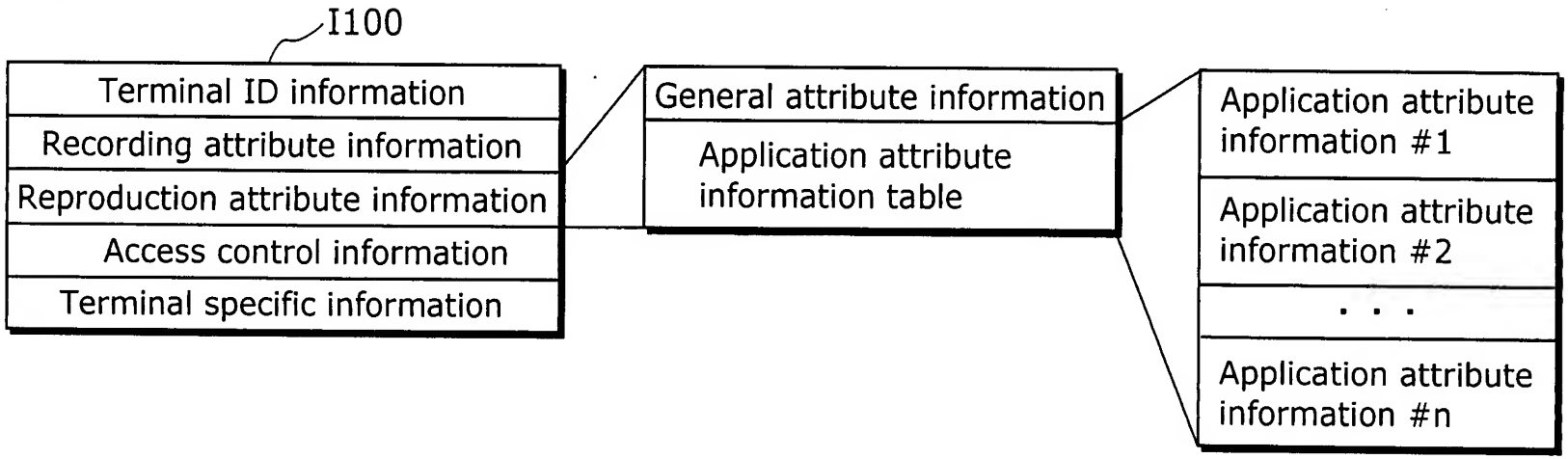


Fig. 36B

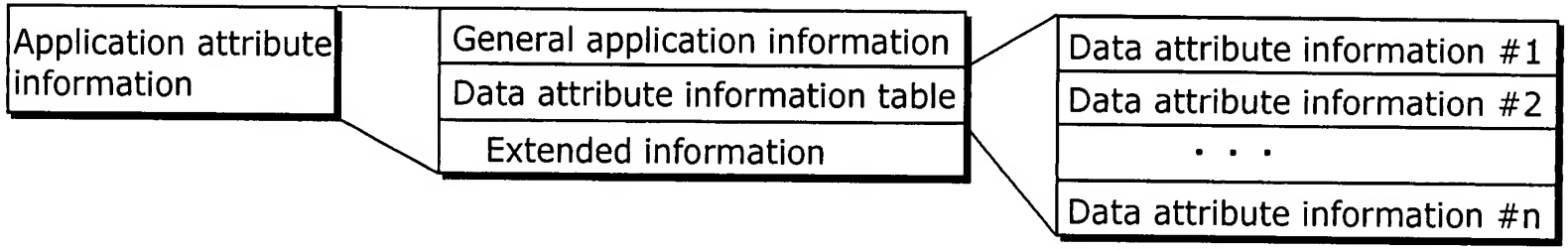


Fig. 37

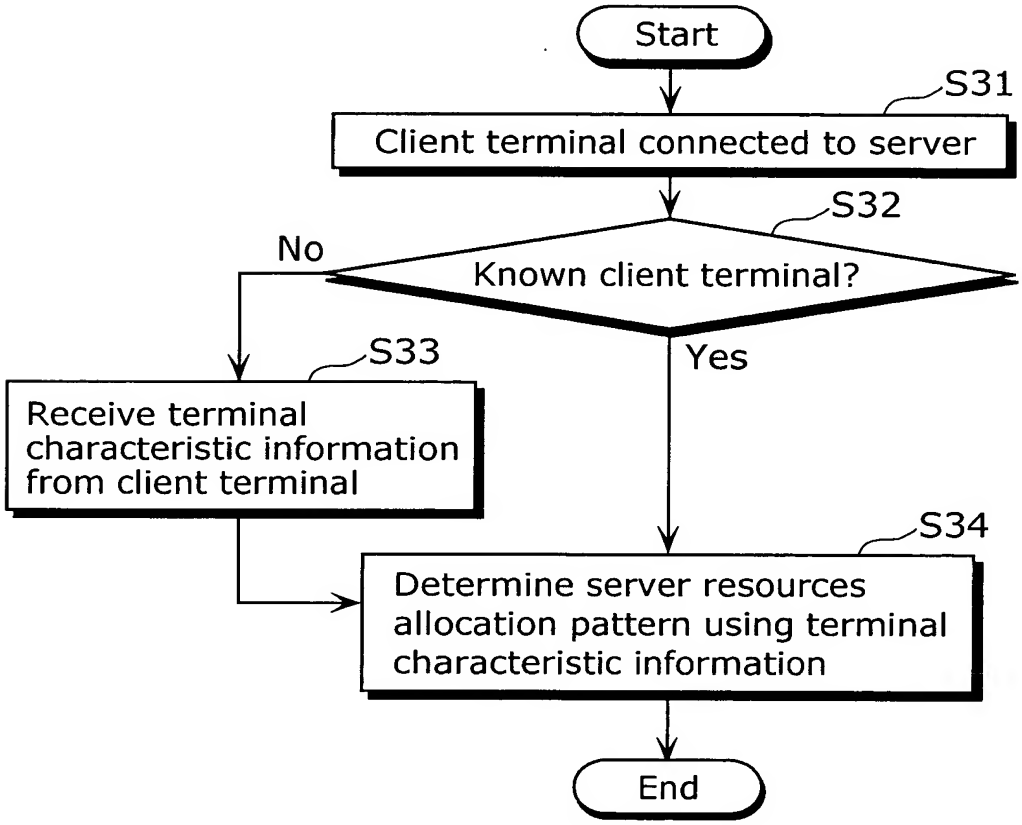

Start
S31
Client terminal connected to server
S32
No
Known client terminal?
Yes
S33
Receive terminal characteristic information from client terminal
S34
Determine server resources allocation pattern using terminal characteristic information
End

Fig. 38

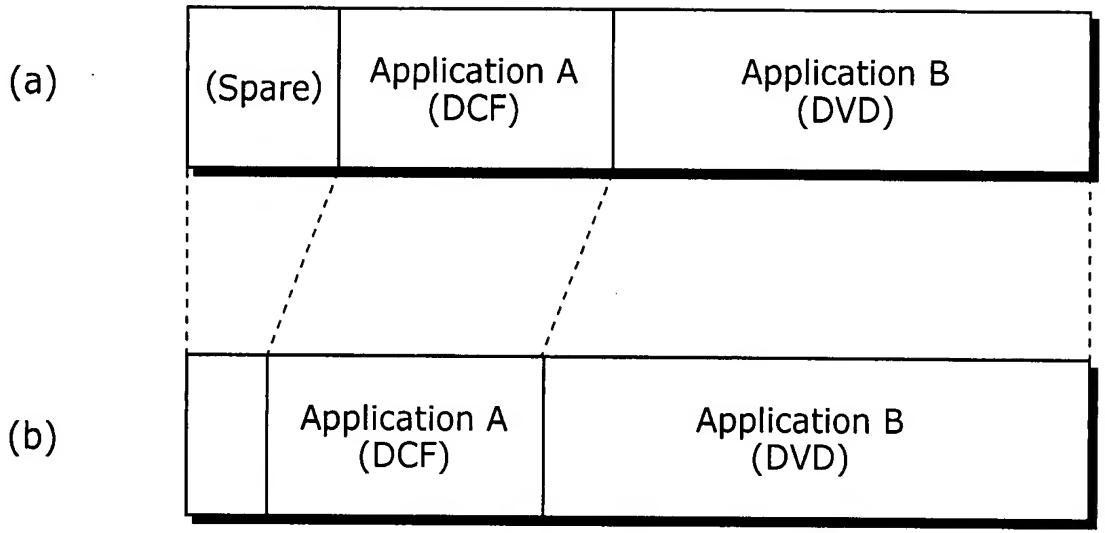

(a)
(Spare)
Application A
(DCF)
Application B
(DVD)
(b)
Application A
(DCF)
Application B
(DVD)

Fig. 39

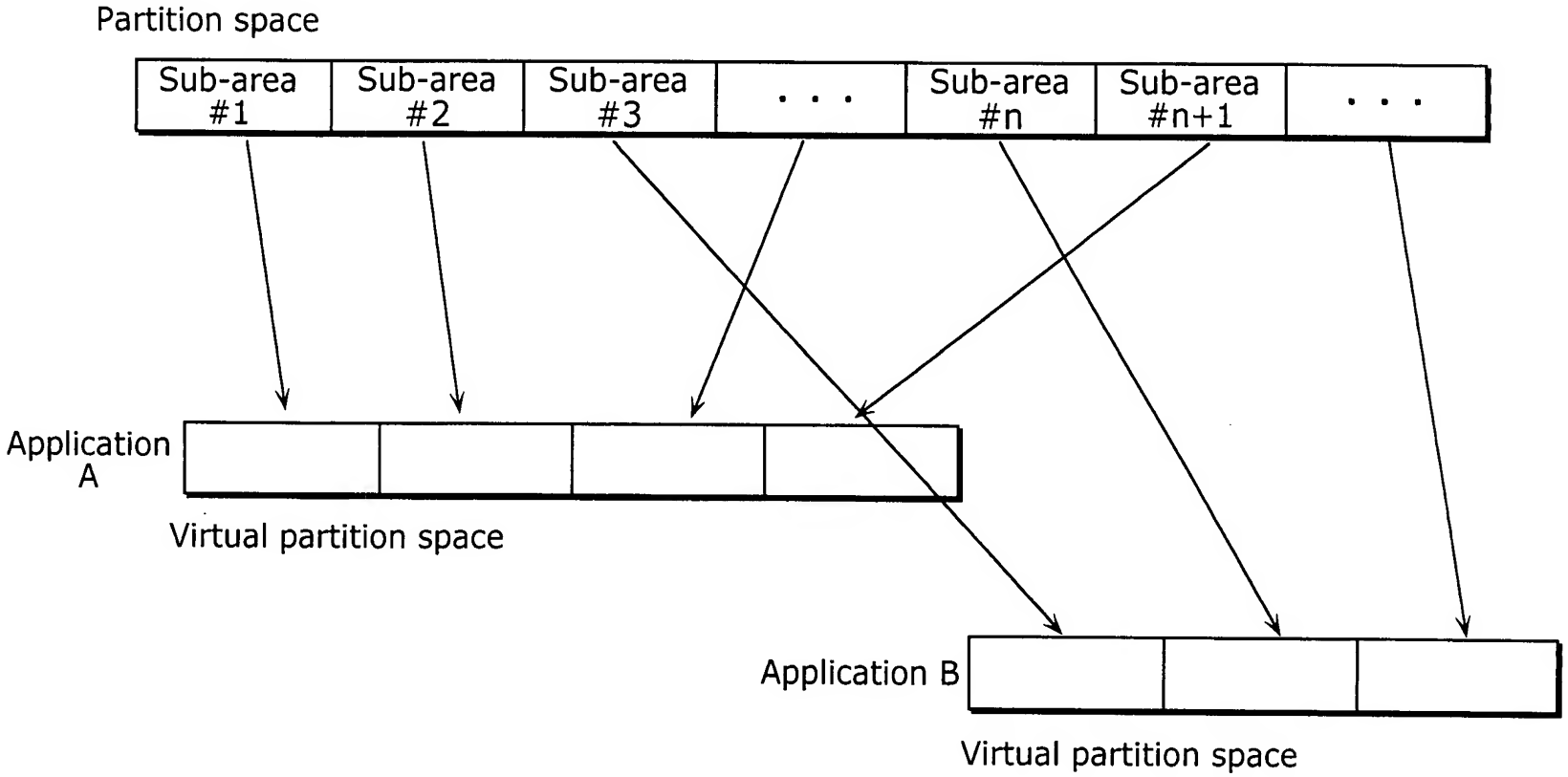

Partition space
Sub-area #1
Sub-area #2
Sub-area #3
. . .
Sub-area #n
Sub-area #n+1
. . .
Application A
Virtual partition space
Application B
Virtual partition space

Fig. 40

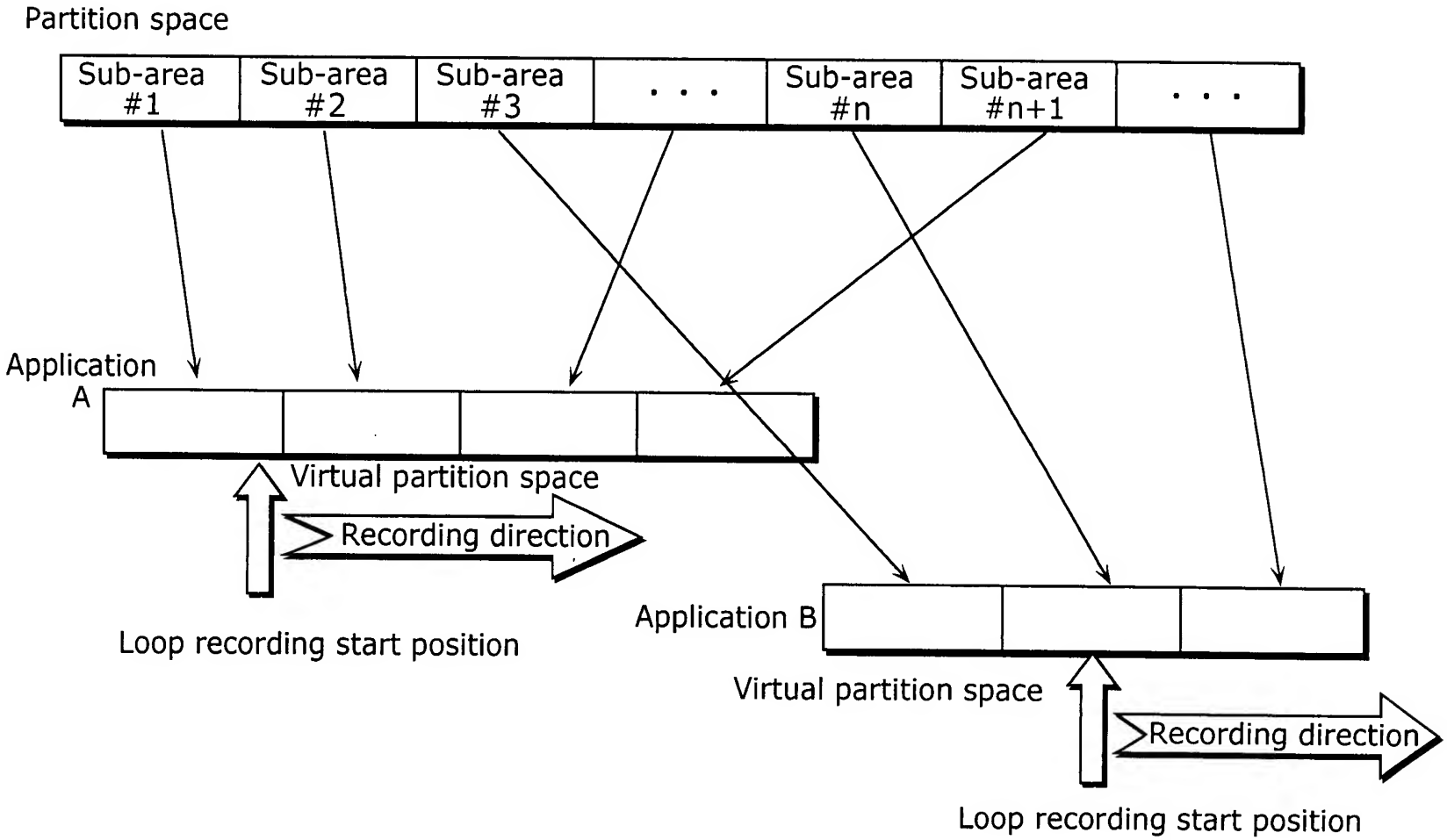

Partition space
Sub-area #1
Sub-area #2
Sub-area #3
. . .
Sub-area #n
Sub-area #n+1
. . .
Application A
Virtual partition space
Recording direction
Loop recording start position
Application B
Virtual partition space
Recording direction
Loop recording start position

Fig. 41A

Client terminal list	Server resources to be allocated to each client terminal		
	Pattern 1	Pattern 2	Pattern 3
Client A Client B Client C	Recording transfer band: 80Mbps (No allocation) Recording transfer band: 20Mbps	Recording transfer band: 20Mbps Recording transfer band: 70Mbps Recording transfer band: 10Mbps	(No pattern)

Fig. 41B

Client terminal list	Server resources to be allocated to each client terminal		
	Pattern 1	Pattern 2	Pattern 3
Client A Client B Client C	Recording transfer band: 80Mbps (No allocation) Recording transfer band: 10Mbps	Recording transfer band: 20Mbps Recording transfer band: 70Mbps Recording transfer band: 10Mbps	(No allocation) Recording transfer band: 90Mbps Recording transfer band: 10Mbps <User-made pattern>

Fig. 42

Client terminal list	Server resources to be allocated to each client terminal		
	Pattern 1	Pattern 2	Pattern 3
Client A	Recording transfer band : 100Mbp	Recording transfer band : 80Mbp	Recording transfer band : 20Mbp
Client B	Recording transfer band : 90Mbp	Recording transfer band : 70Mbp	(No pattern)
Client B Client C	Recording transfer band: 90Mbp Recording transfer band: 10Mbp	Recording transfer band: 70Mbp Recording transfer band: 10Mbp	(No pattern)
Client A Client B Client C	Recording transfer band: 80Mbp (No allocation) Recording transfer band: 10Mbp	Recording transfer band: 20Mbp Recording transfer band: 70Mbp Recording transfer band: 10Mbp	(No allocation) Recording transfer band: 90Mbp Recording transfer band: 10Mbp <User-made pattern>

Fig. 43A

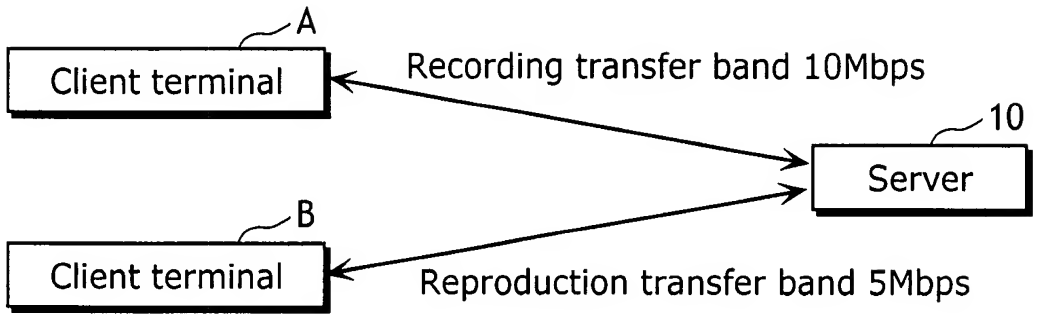


Fig. 43B

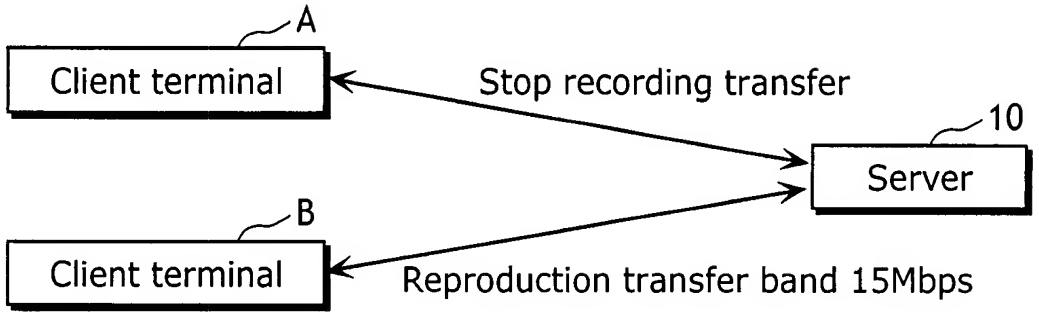


Fig. 44

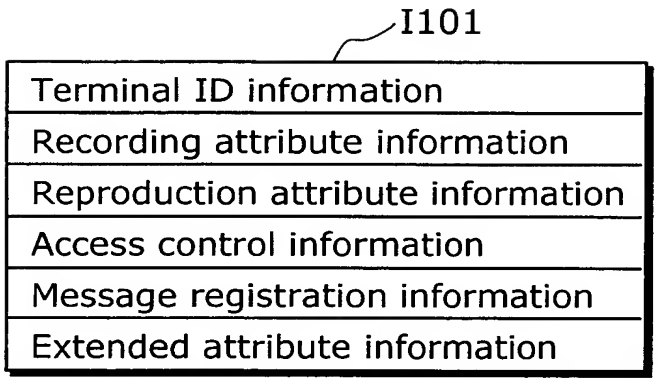

I101
Terminal ID information
Recording attribute information
Reproduction attribute information
Access control information
Message registration information
Extended attribute information

Fig. 45A

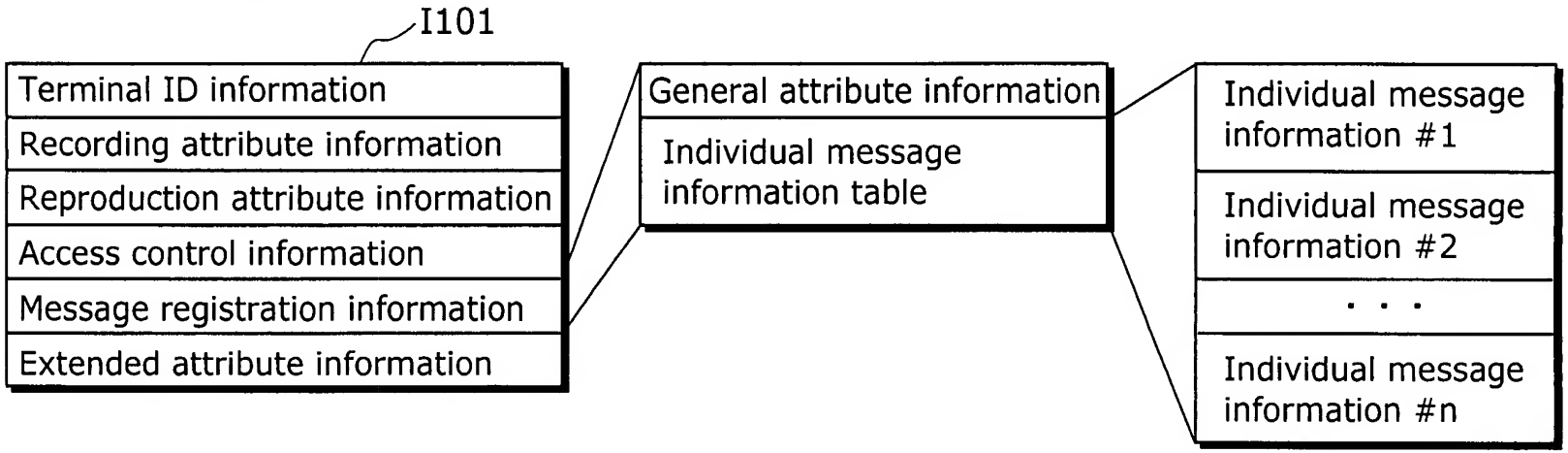


Fig. 45B

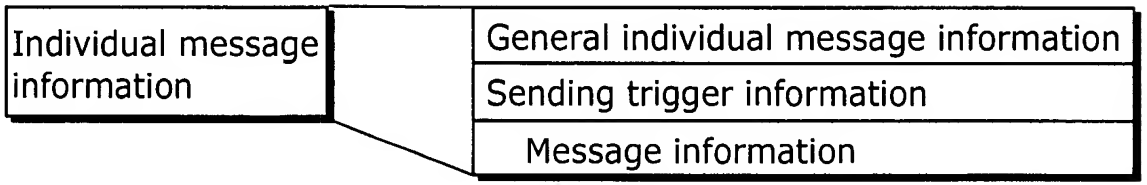


Fig. 46

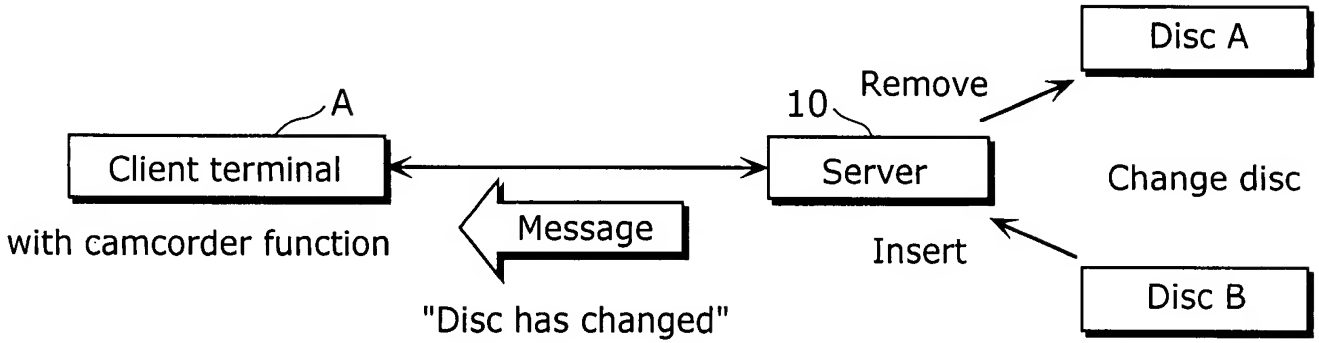

Disc A
Remove
10
A
Server
Client terminal
Change disc
Message
with camcorder function
Insert
Disc B
"Disc has changed"

Fig. 47

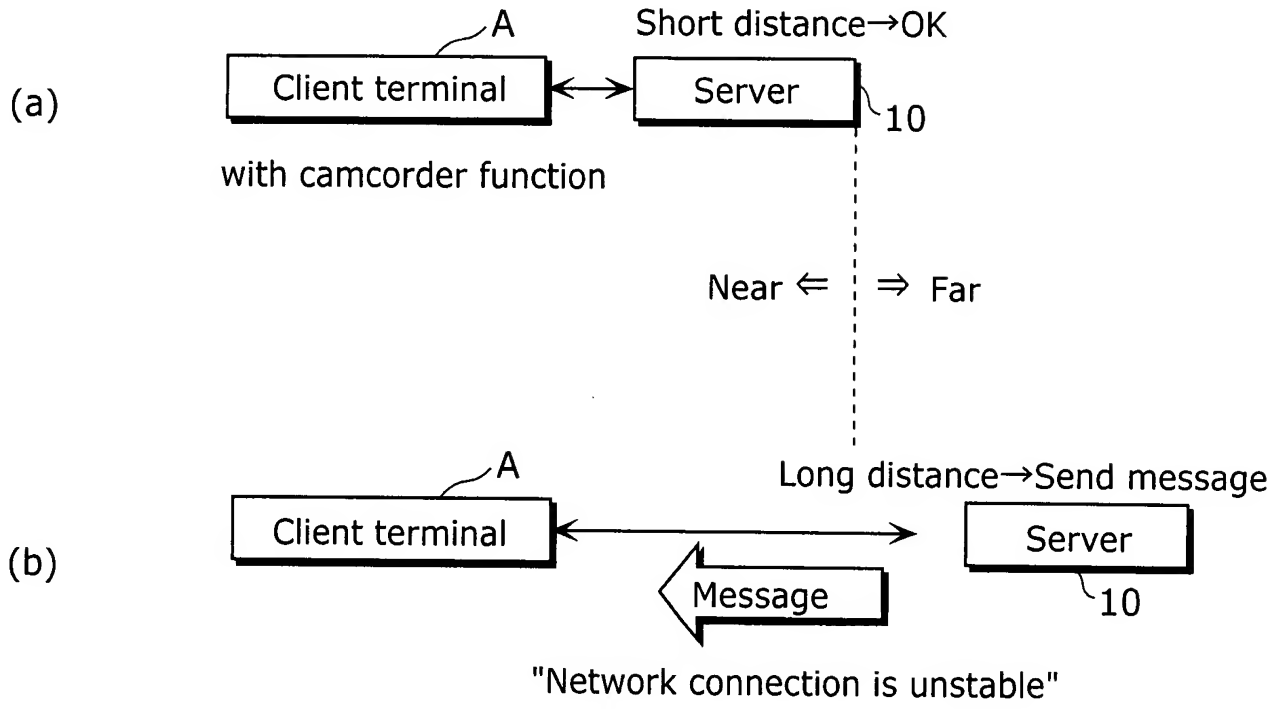

(a)
A
Short distance→OK
Client terminal
Server
10
with camcorder function
Near ⇐
⇒ Far
(b)
A
Long distance→Send message
Client terminal
Server
Message
10
"Network connection is unstable"

Fig. 48

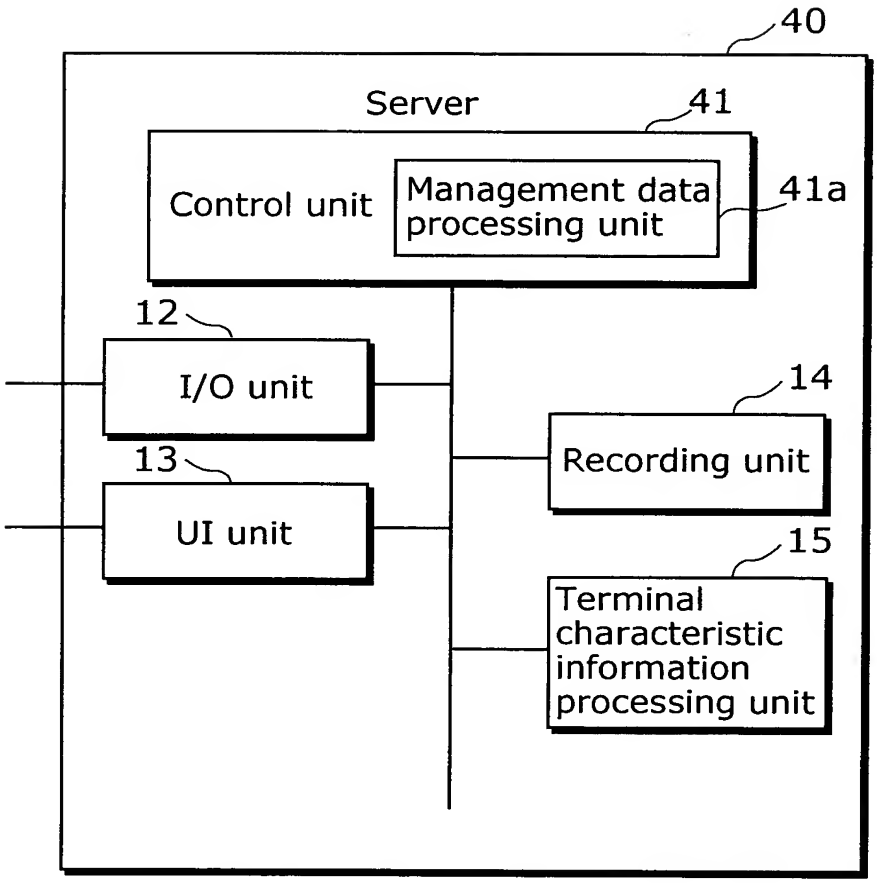

40
Server
41
Control unit
Management data processing unit
41a
12
I/O unit
14
Recording unit
13
UI unit
15
Terminal characteristic information processing unit

Fig. 49

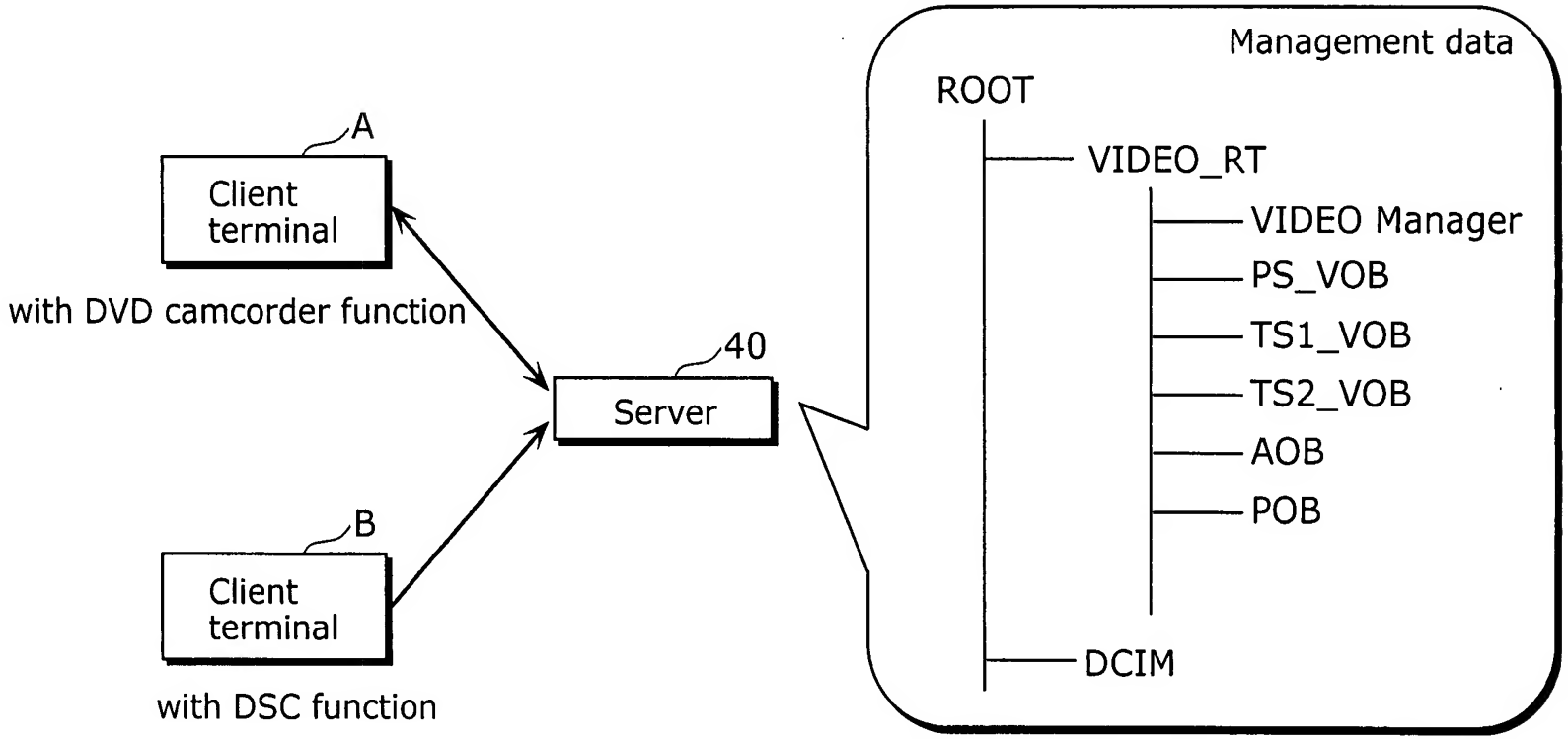

A
Client terminal
with DVD camcorder function
B
Client terminal
with DSC function
40
Server
Management data
ROOT
VIDEO_RT
VIDEO Manager
PS_VOB
TS1_VOB
TS2_VOB
AOB
POB
DCIM

Fig. 50

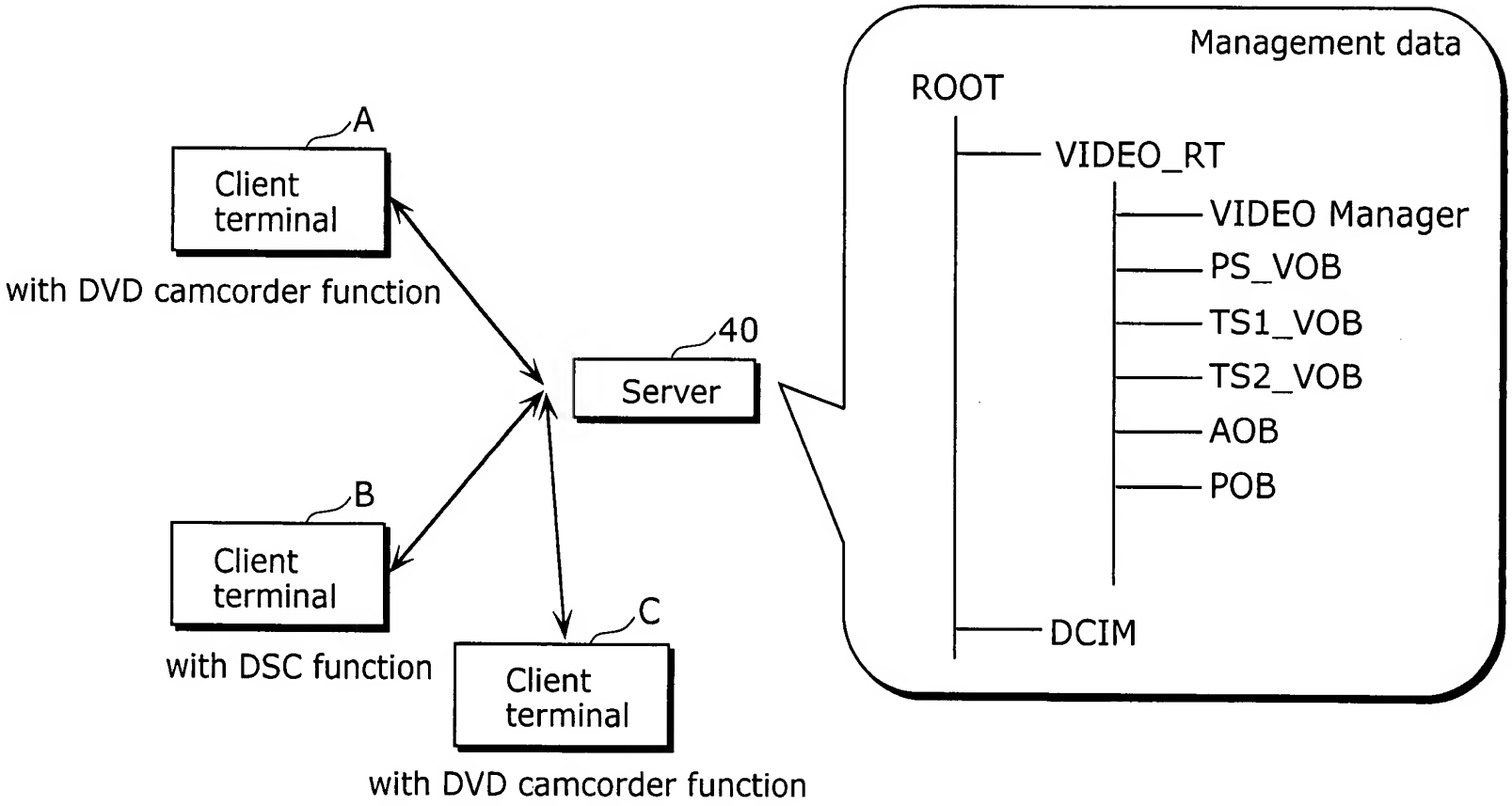

Management data
ROOT
VIDEO_RT
VIDEO Manager
PS_VOB
TS1_VOB
TS2_VOB
AOB
POB
DCIM
A
Client terminal
with DVD camcorder function
40
Server
B
Client terminal
with DSC function
C
Client terminal
with DVD camcorder function

Fig. 51

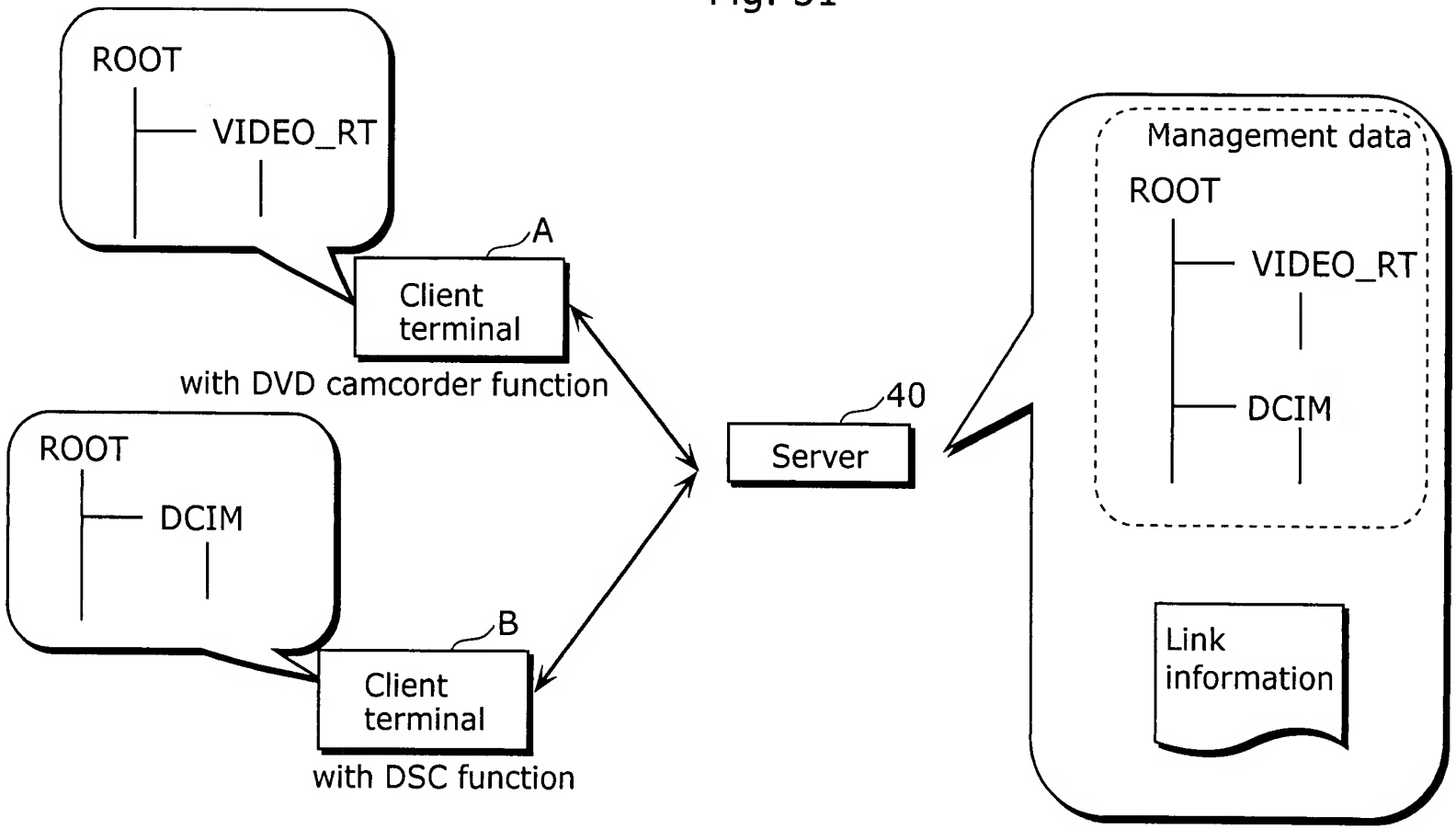

ROOT
VIDEO_RT
A
Client terminal
with DVD camcorder function
ROOT
DCIM
B
Client terminal
with DSC function
40
Server
Management data
ROOT
VIDEO_RT
DCIM
Link information

Fig. 52

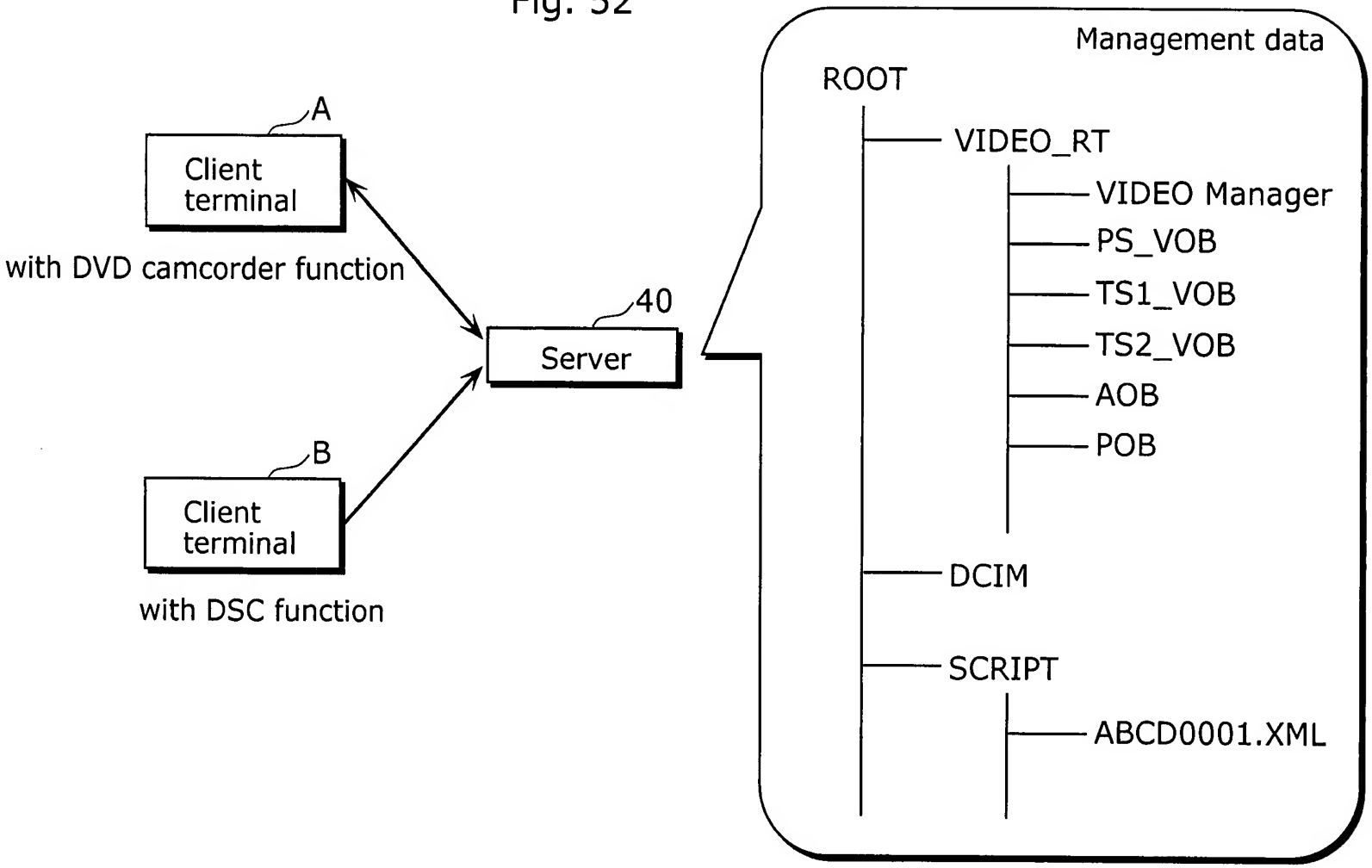

A
Client terminal
with DVD camcorder function
B
Client terminal
with DSC function
40
Server
Management data
ROOT
VIDEO_RT
VIDEO Manager
PS_VOB
TS1_VOB
TS2_VOB
AOB
POB
DCIM
SCRIPT
ABCD0001.XML

Fig. 53

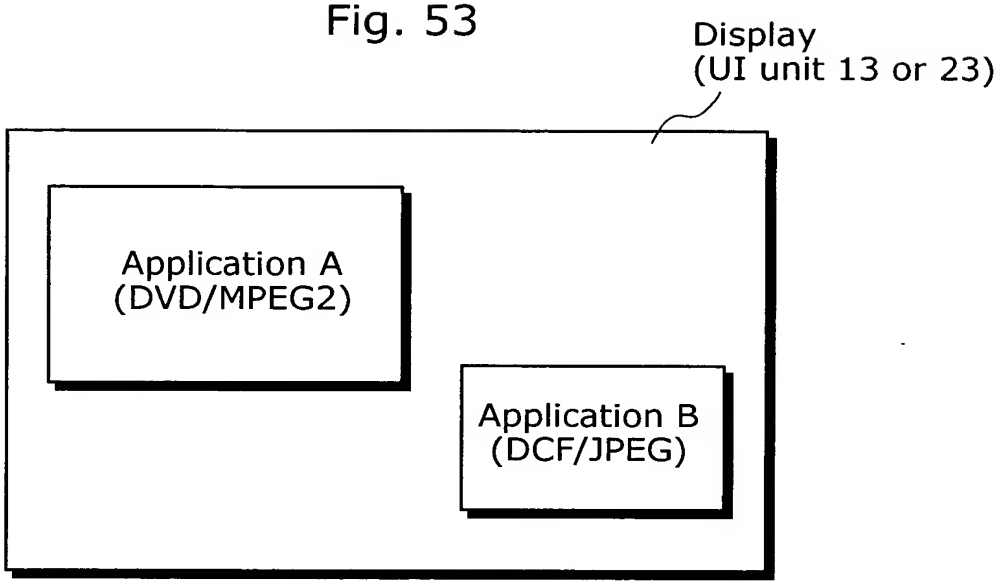

Display
(UI unit 13 or 23)
Application A
(DVD/MPEG2)
Application B
(DCF/JPEG)

Fig. 54

```
<smil>
 <head>
  <layout>
   <!--layout tags-->
    <region regionname="A" top="・・・"left="・・・"bottom="・・・"right="・・・"/>
    <region regionname="B" top="・・・"right="・・・"width="・・・"height="・・・"/>
  </layout>
 </head>
 <body>
  <!--body tags-->
  <seq>                                    1
    <img video="1000ABCD.MPG" region="A"/>
    <par>                                  2
      <img video="2000ABCD.MPG" region="A"/>
      <img src="2001ABCD.JPG" region="B" dur="T2"/>
    </par>                                 3
    <img video="3000ABCD.MPG" region="A"/>
  </seq>                                   4
 </body>
</smil>
```

Fig. 55

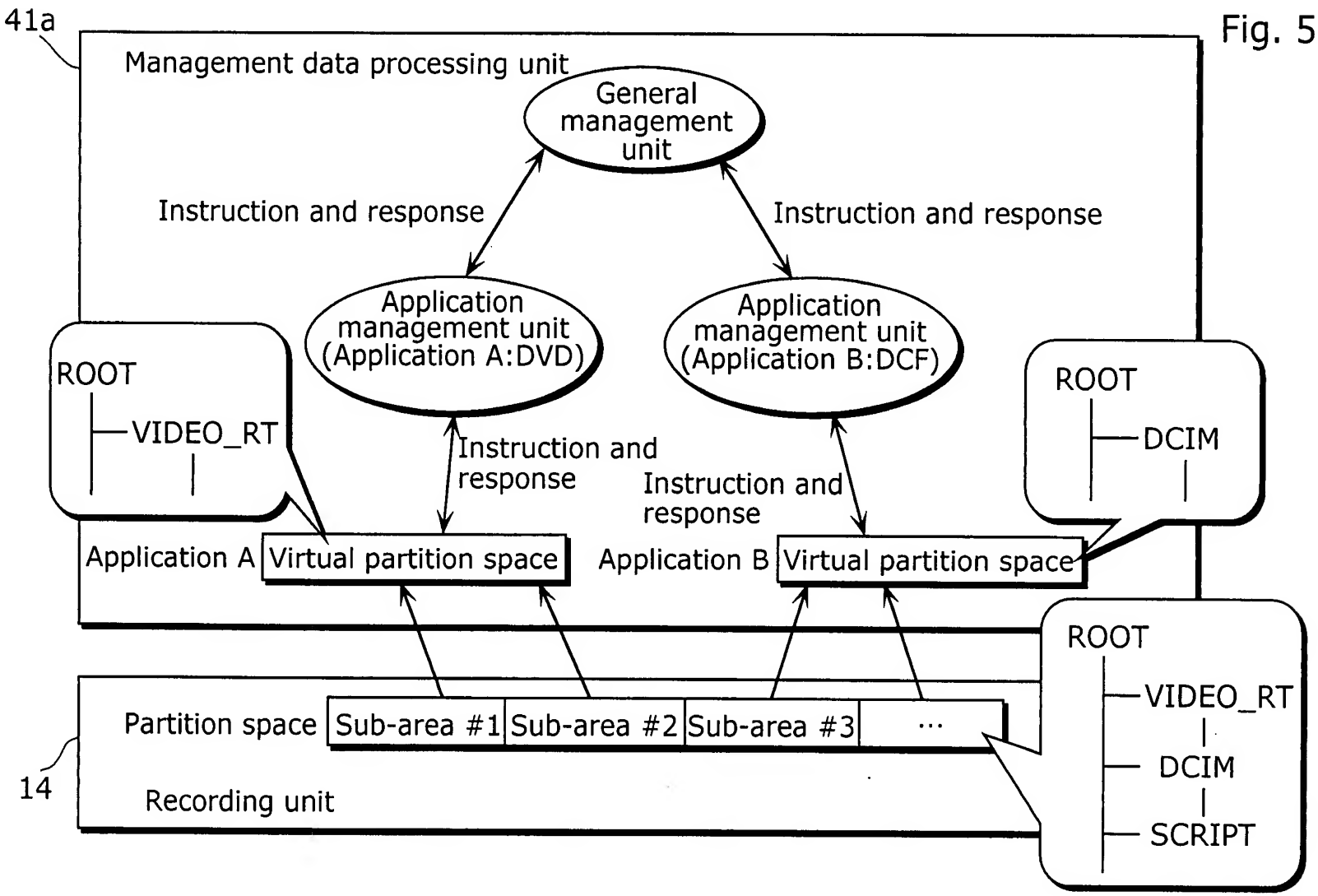

41a
Management data processing unit
General management unit
Instruction and response
Instruction and response
Application management unit (Application A:DVD)
Application management unit (Application B:DCF)
ROOT
VIDEO_RT
Instruction and response
Instruction and response
ROOT
DCIM
Application A
Virtual partition space
Application B
Virtual partition space
ROOT
VIDEO_RT
DCIM
SCRIPT
Partition space
Sub-area #1
Sub-area #2
Sub-area #3
...
14
Recording unit

Fig. 56

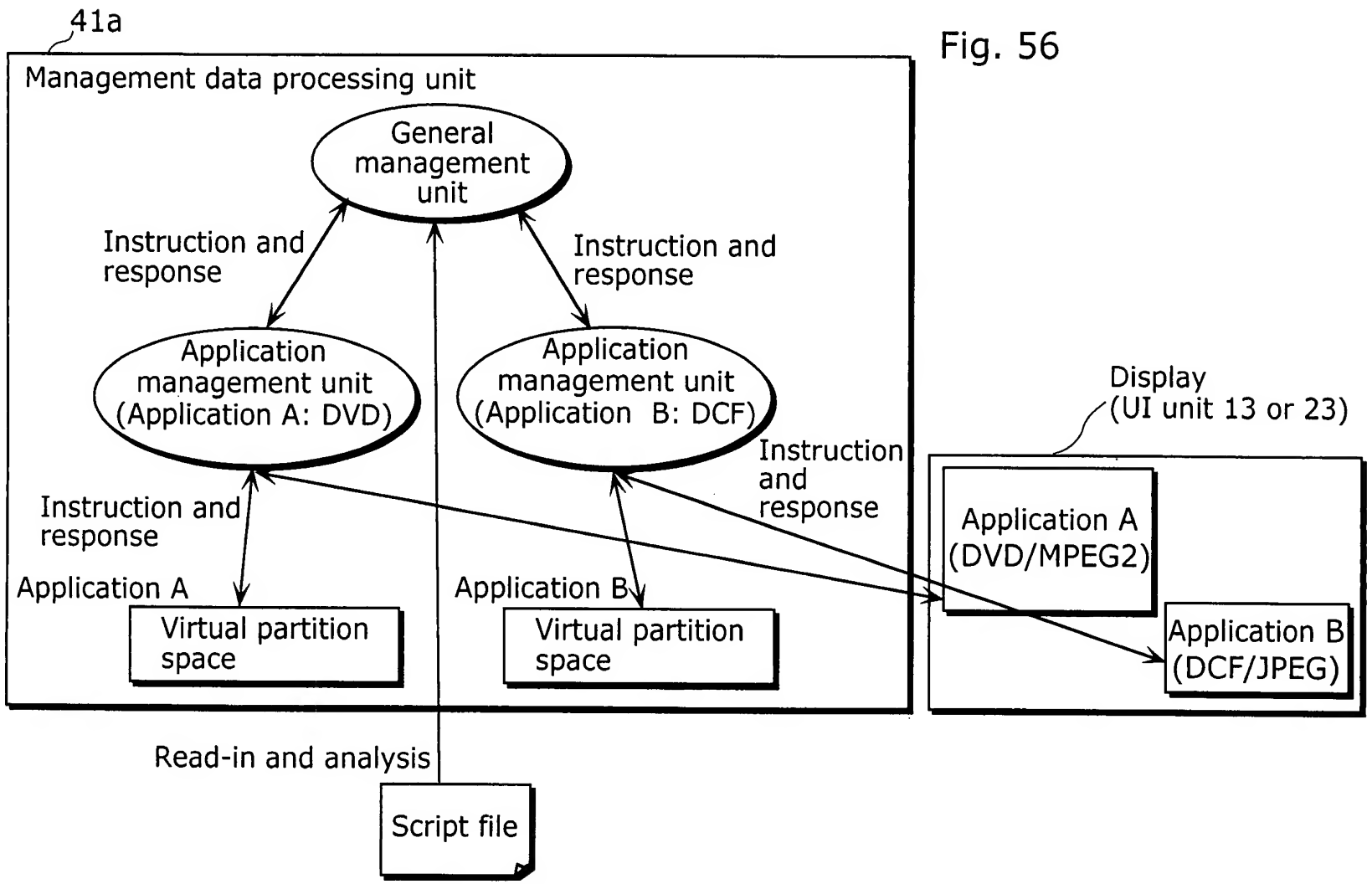
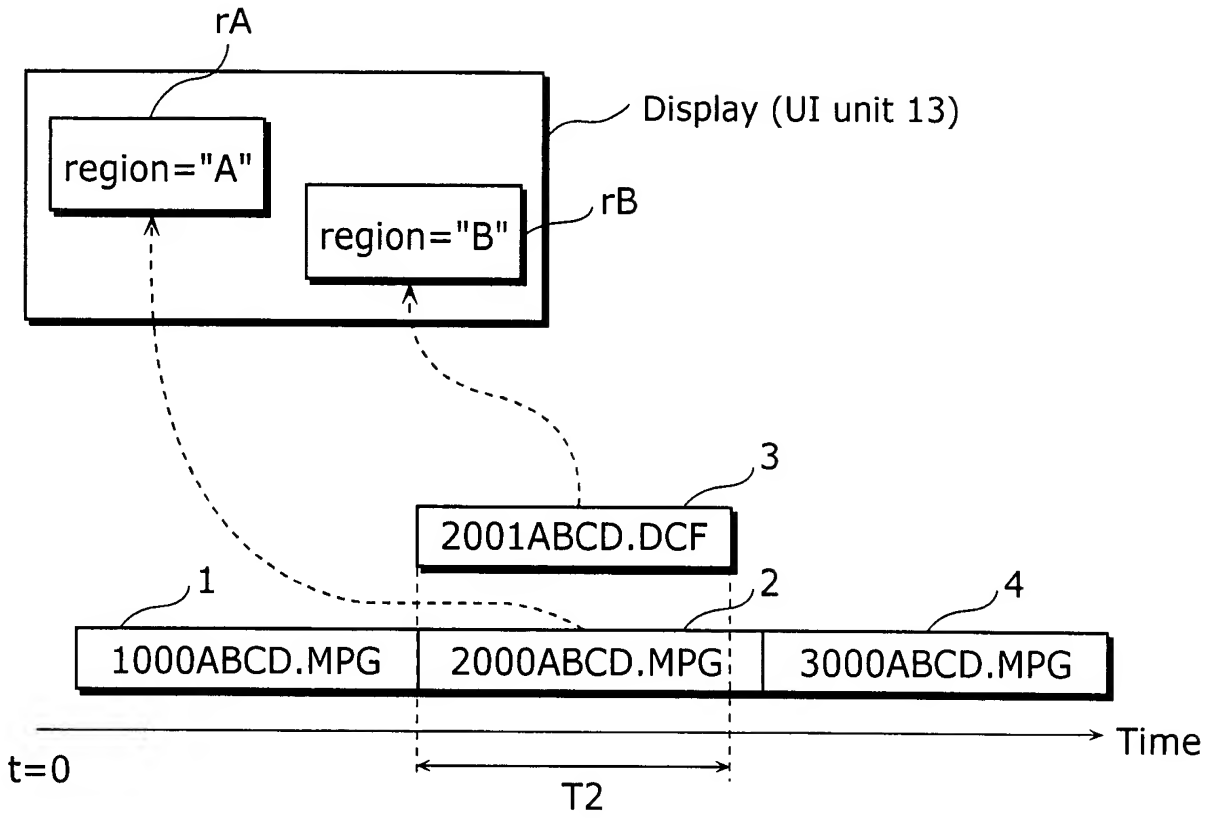

41a
Management data processing unit
General management unit
Instruction and response
Instruction and response
Application management unit (Application A: DVD)
Application management unit (Application B: DCF)
Instruction and response
Instruction and response
Application A
Application B
Virtual partition space
Virtual partition space
Display (UI unit 13 or 23)
Application A (DVD/MPEG2)
Application B (DCF/JPEG)
Read-in and analysis
Script file

Fig. 57


(a)
rA
Display (UI unit 13)
region="A"
region="B"
rB
(b)
3
2001ABCD.DCF
1
2
4
1000ABCD.MPG
2000ABCD.MPG
3000ABCD.MPG
Time
t=0
T2